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CONTENTS

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THE UNIQUE CONTINENT

By HERBERT E. GREGORY

With 80 Illustrations

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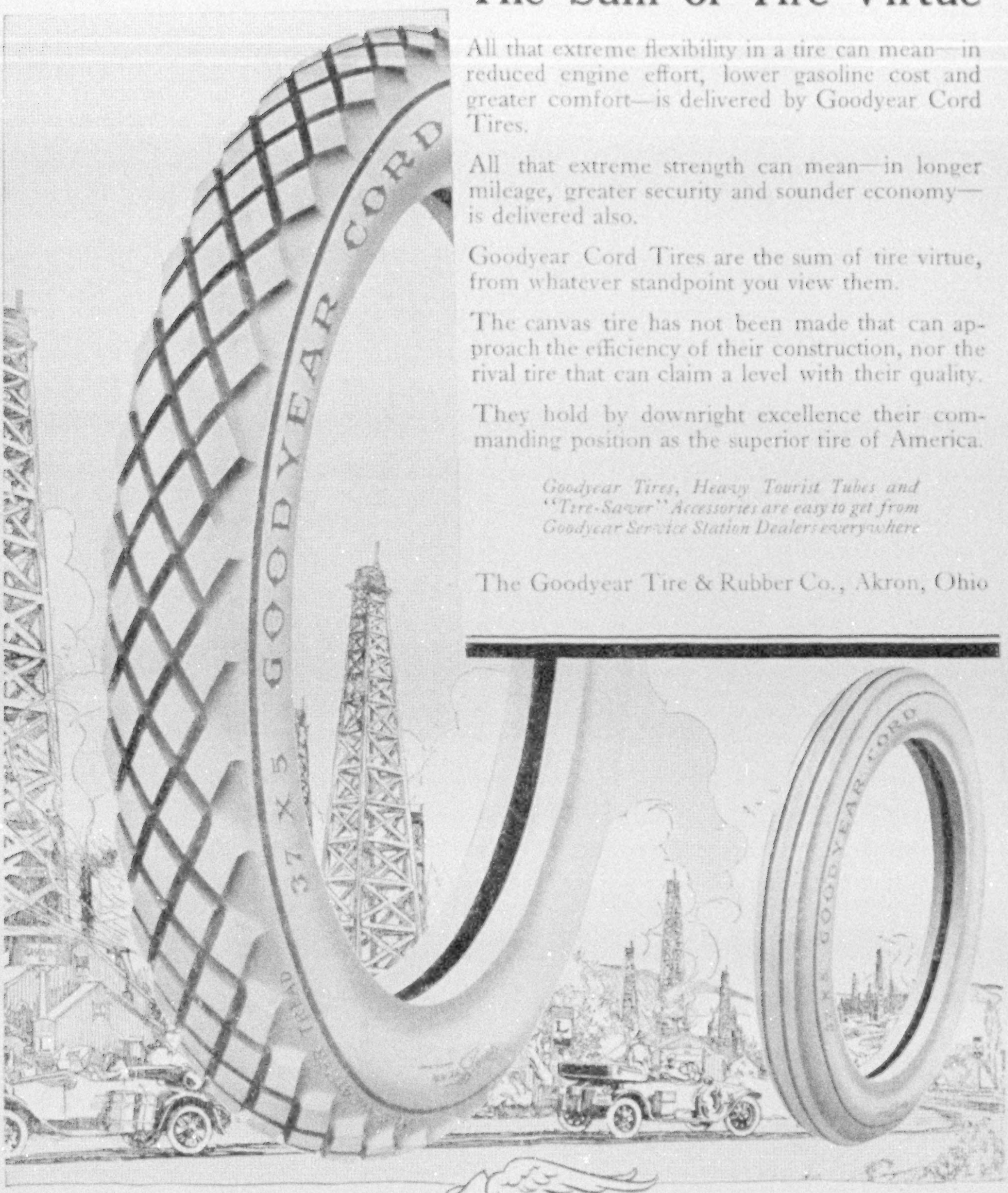

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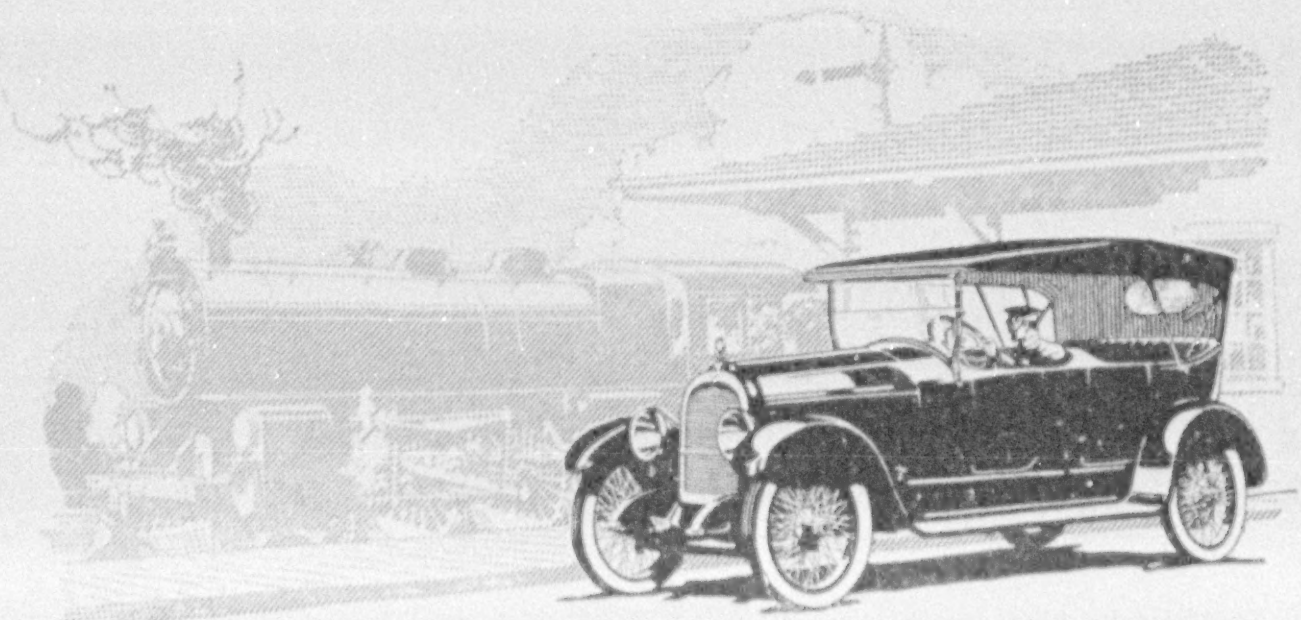

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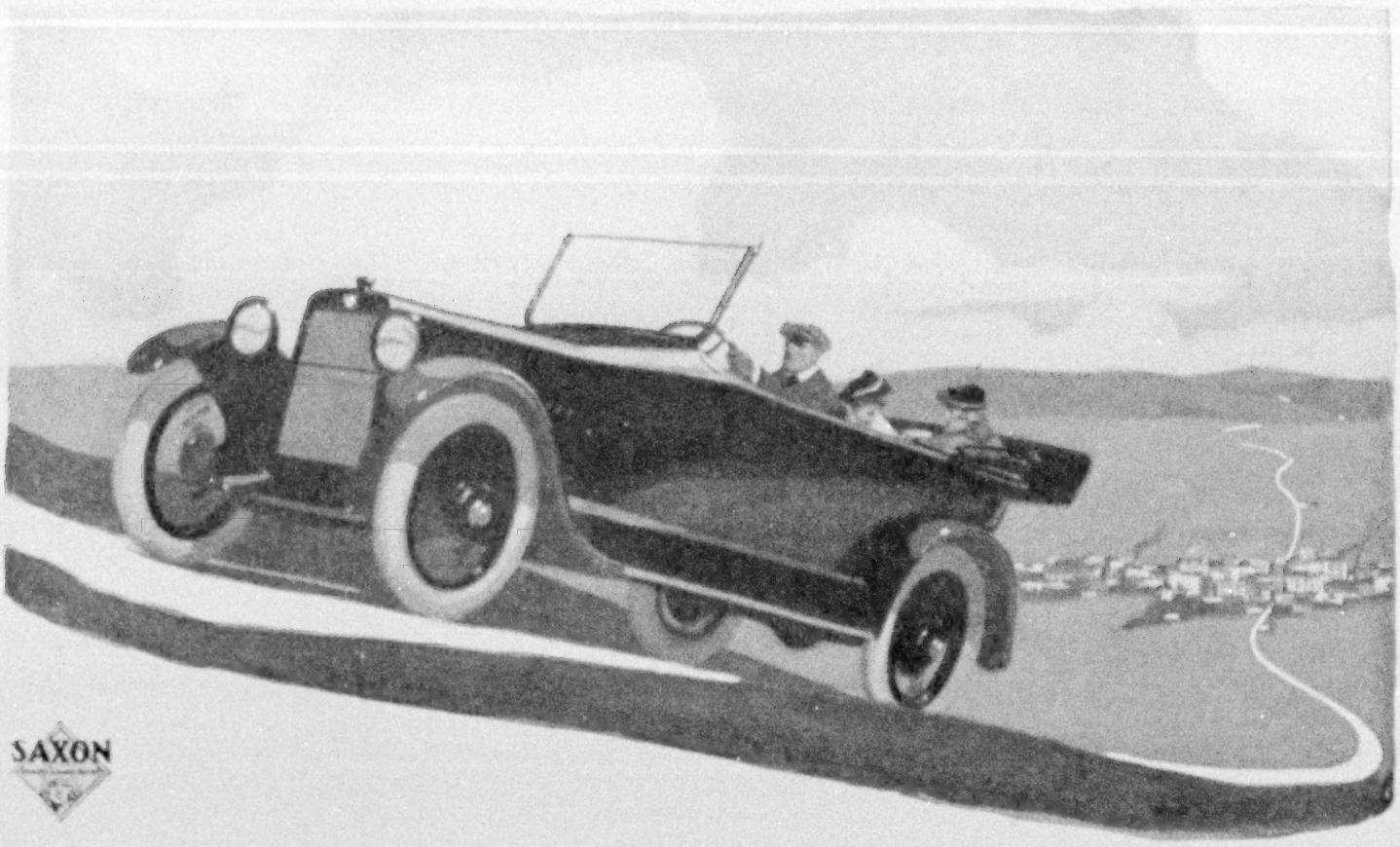

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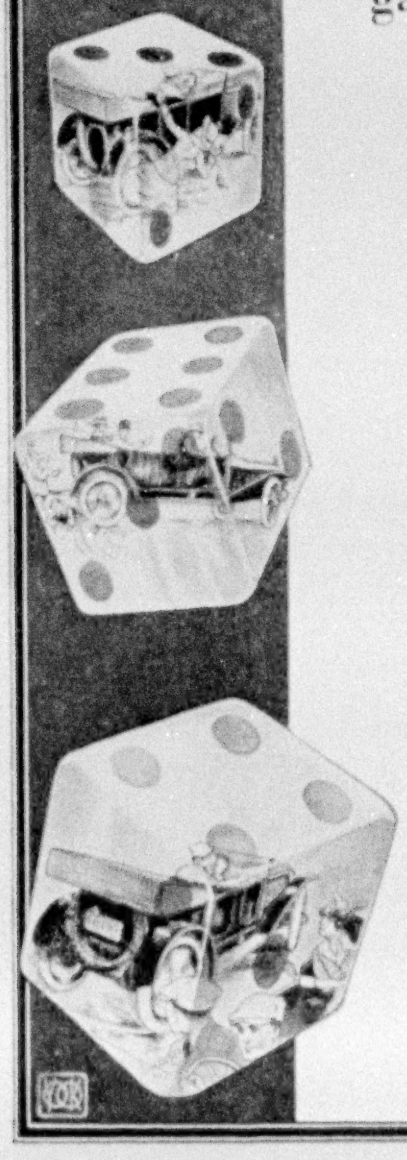

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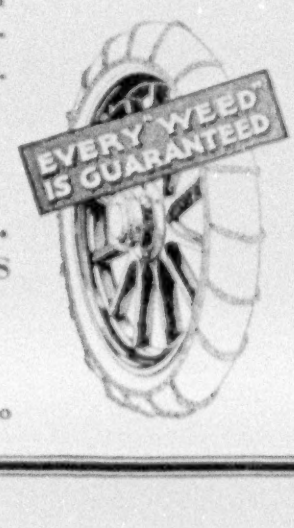

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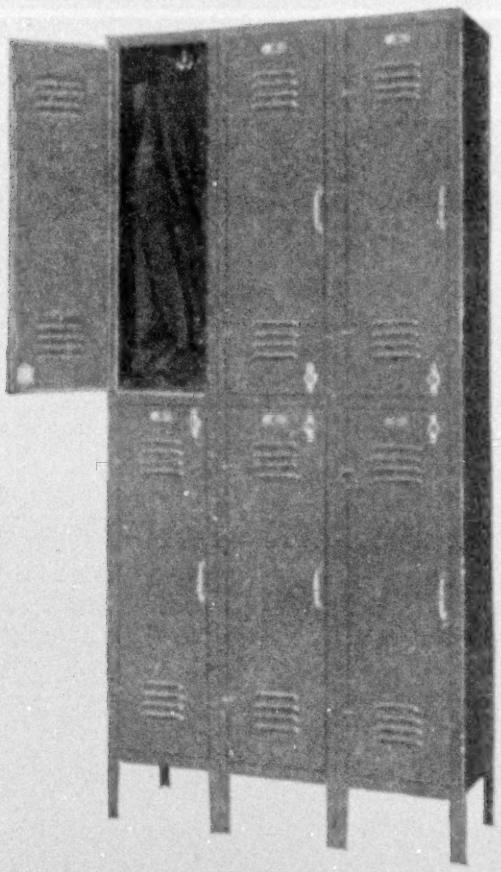

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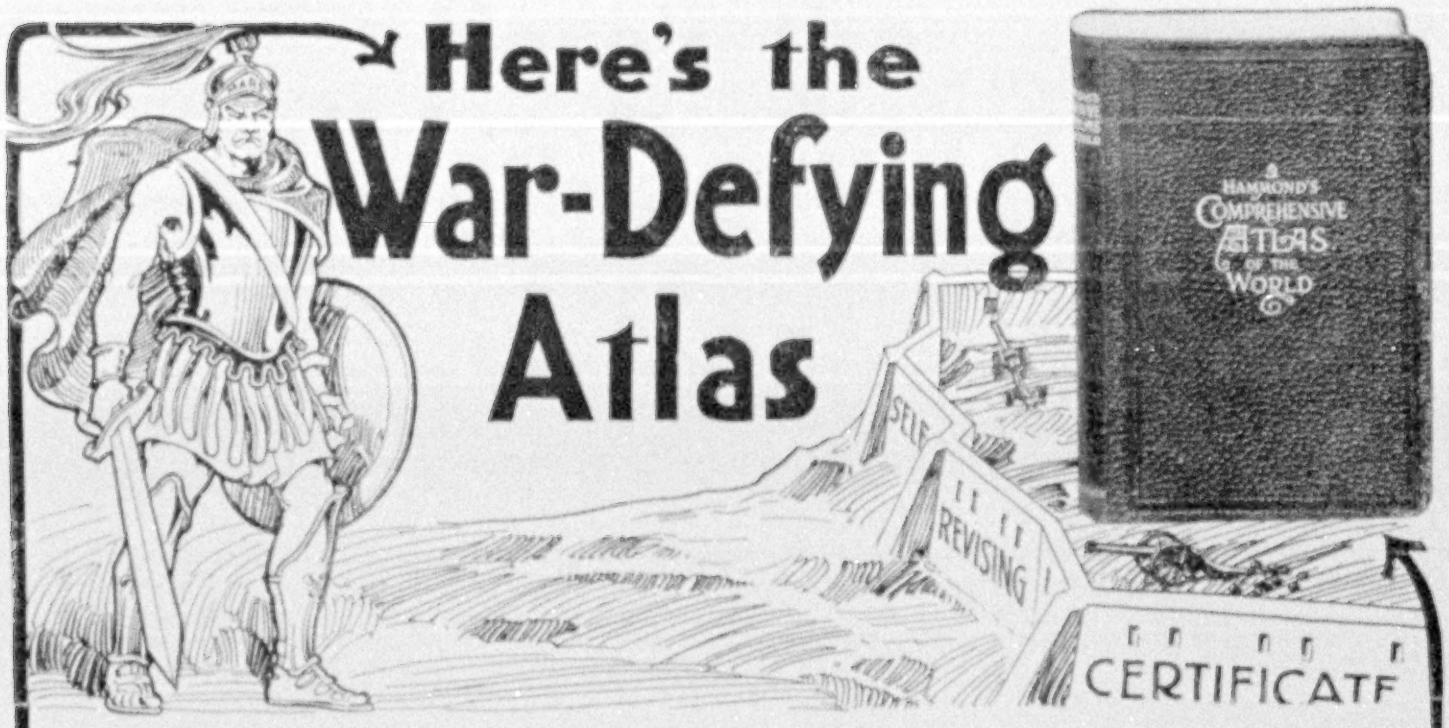

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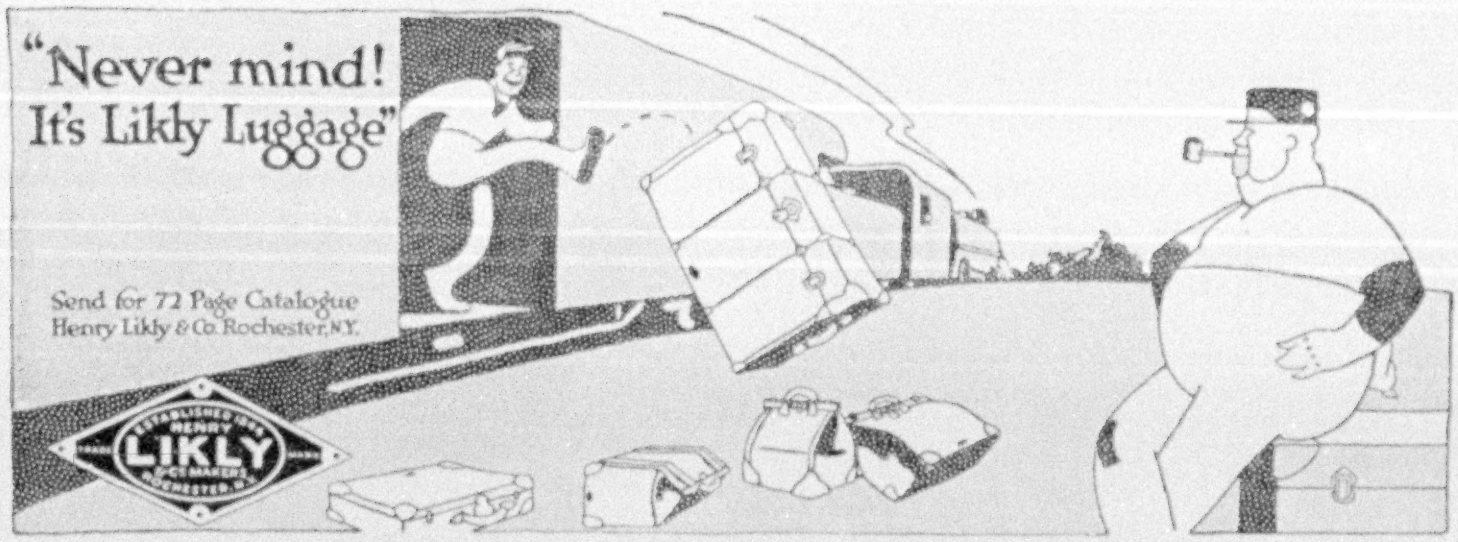

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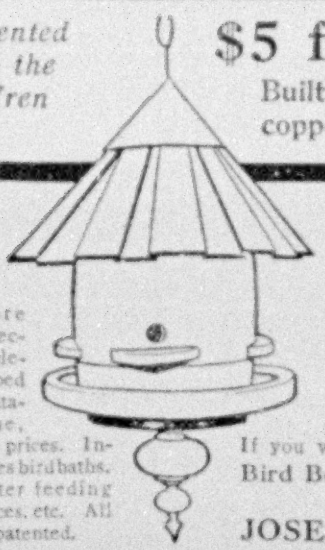

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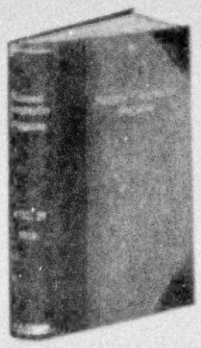

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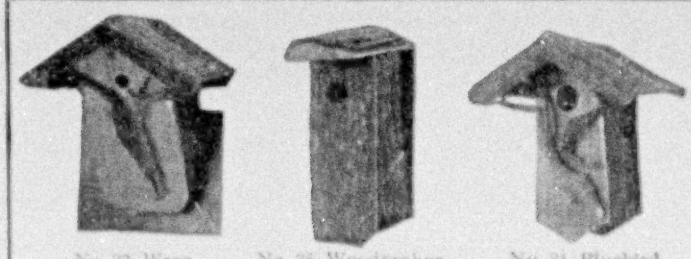

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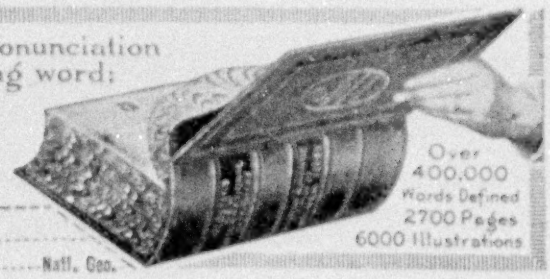

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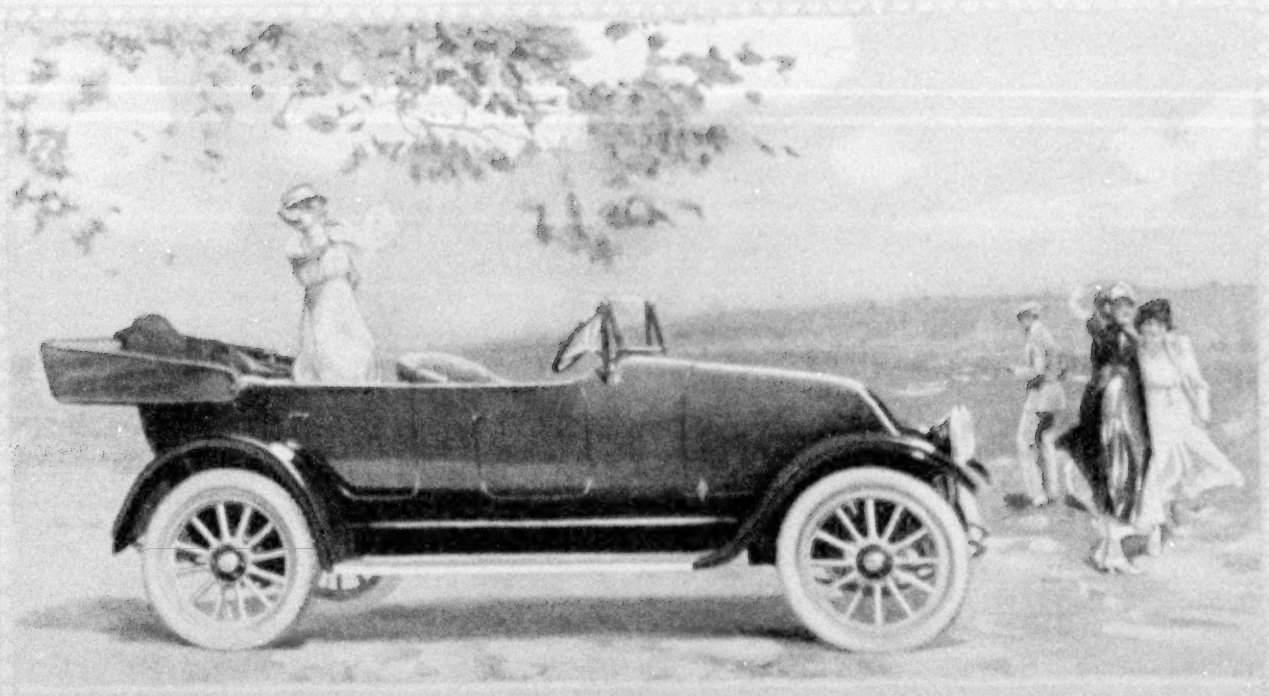

THE FRANKLIN CAR

WHEREVER you go nowadays and hear men talking motor cars, you will find that one man has just *bought* the make of car the other has just *abandoned*.

This means that most buyers are still groping for *real standards* by which to judge motor car efficiency.

New cars come out, old cars work up new features and "talking points"—and so the trade shifts.

Watching all this is the solid group of Franklin owners, *who do not change*.

These men and their families know what they *have* in the Franklin Car and *stick to it*. It is the rarest exception for one of them to change—and then he always comes back again. *Our records show this.*

What *holds* these men? What makes them *talk* Franklins? Why has the demand for Franklin Cars doubled, and doubled, and then doubled again within the last two years?

Perhaps it is because these men know some things that the average motorist does not know:—things about comfort and safety, gasoline economy, tire saving, effortless control, *a new mastery of road and traffic conditions*.

The man who has driven a Franklin and any other make of car knows that he can drive his Franklin farther, on longer trips, with less fatigue, with less trouble, and *at less cost* than any other car he ever owned.

The Franklin dealer in your town can prove this to you. *Ask him.*

Touring Car	2280 lbs.—$1850.00	*Cabriolet*	2485 lbs.—$2650.00	*Town Car*	2610 lbs.—$3000.00
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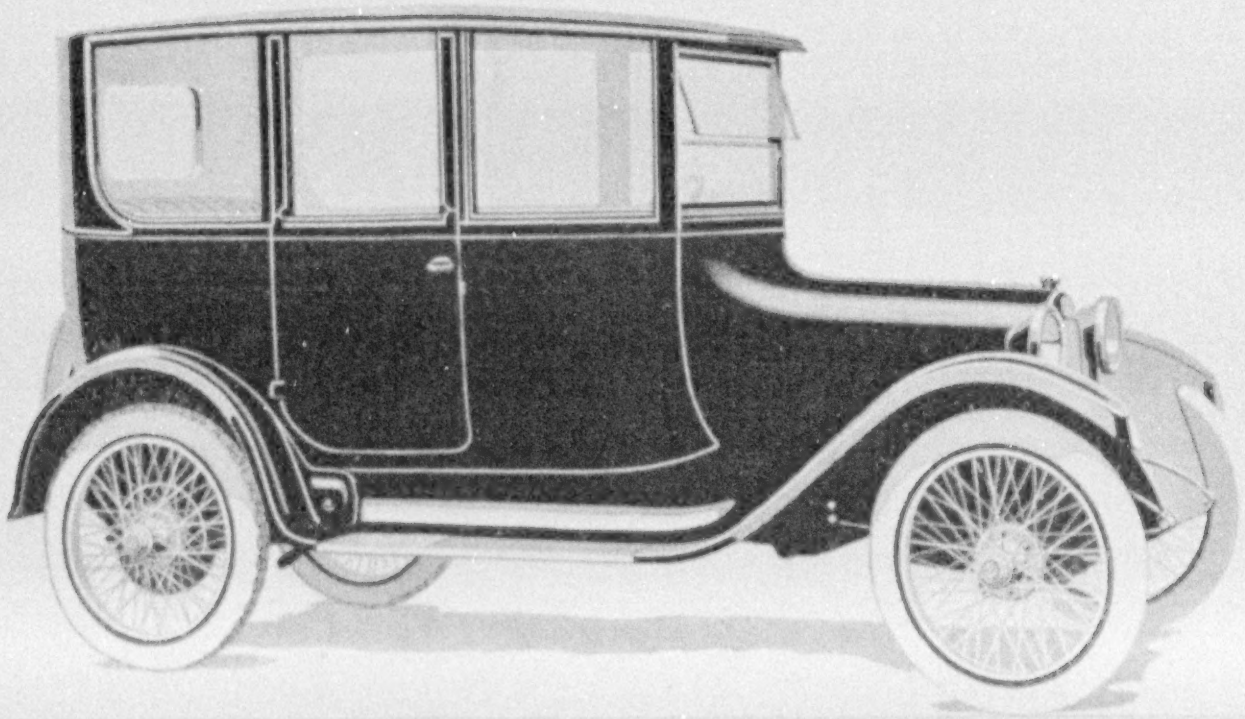
CLOSED CAR

A convertible sedan such as you would expect from Dodge Brothers. A pleasing combination of smartness and comfort. Designed and built complete in Dodge Brothers works.

The price of the sedan complete is $1185 (f. o. b. Detroit).

Canadian price, $1685 (add freight from Detroit).

DODGE BROTHERS, DETROIT



Mister Man and Mister Manager

MR. MAN lives in our town. He has lived there quite a while. He directs a business that is marking time, but he does not know it. That's why he's Mr. Man perhaps.

His salesmen plod listlessly from the Can't-See-Yous to the Nothing-Doings. They live on crumbs.

He advertises now and then, but if you should ask about his follow-up he would not understand. To him a postage stamp presents no opportunities.

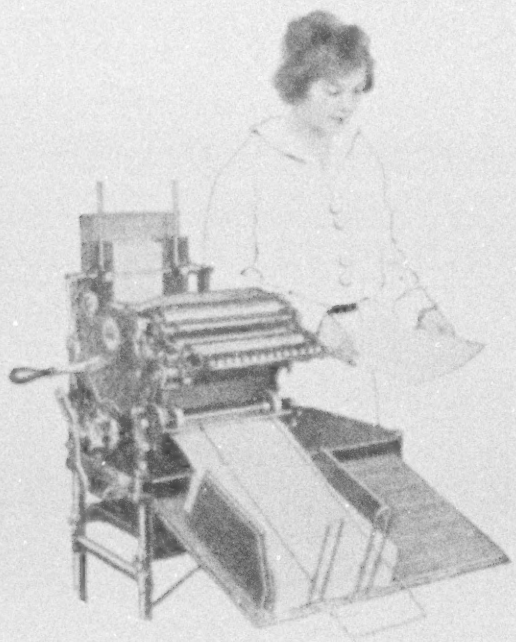
His stock clerk brushes cobwebs from the shelves. Printed matter long since obsolete lies in yellowed wrappers.

But he is not the only Mr. Man. You may know his counterpart.

Mr. Manager also lives in our town. He has lived there quite a while as well. He manages a business that is growing fast. Perhaps that's because he's Mr. Manager.

His salesmen are keen and bright. He paves the way for them with Multigraphed letters and printed folders and they're on the jump from the Expecting-Yous to the Glad-You've-Comes.

He advertises persistently and his follow-up is what it's named. To him a postage stamp is a golden opportunity. His mailing lists are busy every minute. His stock clerk never saw a spider. With their Multigraph they need only print the actual quantities they need. So dead forms are unknown and age can not creep upon their printed matter.



Multigraph Senior—Electrically driven and completely equipped for high grade printing with printers' ink, type or electrotypes, or for producing typewritten letters in quantities. Prices, $670 to $720. Hand-driven models, $200 up. Easy payments.

But he is not the only Mr. Manager, and these are not the only things he accomplishes with his right-hand aid, the Multigraph.

You know his counterpart—if you know a Multigraph user most anywhere. And the Mr. Manager you know will gladly tell you of his Multigraph accomplishments, if you'll ask him; or we'll gladly tell you of those of many others, if you'll ask us.

And either way, as a Mr. Manager, you'll see the possibilities.

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Official Position .....

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Each successive year is a milestone in the record of this House. Three and one-half decades ago, this business was founded on this fundamental principal: *Complete safety and thorough protection of the investor.*

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ESTABLISHED 1865

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We will be glad to furnish suggestions for a memorial to meet your ideas of price.

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2—In range of maturities

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REJOICE if your youngsters come trooping in to supper with cheeks tingling from the frosty air and bodies tired from vigorous play on the sliding track, the skating pond or the toboggan slide.

For pleasure and health no exercise can equal the blood-quickening sports of winter. That such minor drawbacks as burning faces and chapped hands cannot be escaped need not worry the children or you so long as Ivory Soap is in the house.

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THE NATIONAL GEOGRAPHIC MAGAZINE

LONELY AUSTRALIA: THE UNIQUE CONTINENT

BY HERBERT E. GREGORY

AUSTRALIA is the most isolated of all inhabited continents and is remote from the center of all of the world's activities. Northward the sailing distance to Japan is approximately 3,000 nautical miles; to India, 2,500 miles. South America is 7,000 miles to the east; and Africa an equal distance west.

From London to the capital of Australia ships by the Suez route traverse approximately 11,000 miles of water and by the Panama Canal, 12,734 miles. From California ports the routes via Samoa, or Fiji, or Tahiti cover a quarter of the circumference of the earth. Australia's only large civilized neighbor within a radius of 1,000 miles is Java.

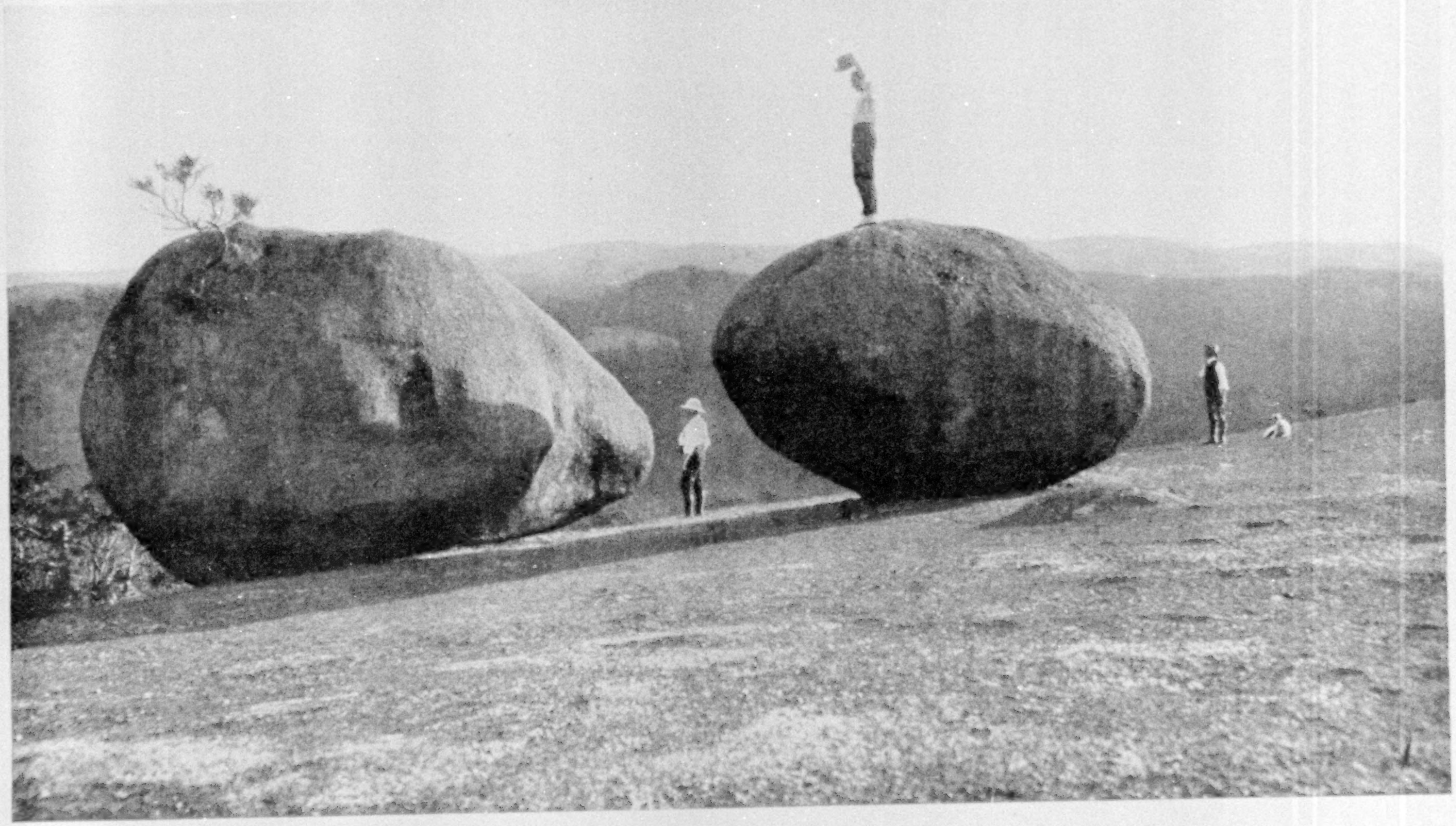
The continent, lying thus far outside the ordinary routes of travel, is rarely visited by Americans. For most of us knowledge of this fascinating land is obtained by a study of a few pages in the back of school geographies—pages descriptive of "Australia and New Zealand" and accompanied by a map of "Australia and the Islands of the Pacific" on a scale too small for the recognition of significant features.

AUSTRALIA AND NEW ZEALAND ARE UNLIKE

One of the first surprises awaiting the tourist from the Northern Hemisphere is to find that Australia and New Zealand may not be grouped as two islands of like appearance, differing mainly in size; near neighbors which may be treated as a unit. New Zealand is nearly twice as far from Australia as Bermuda is from New York, and is not only east but also south.

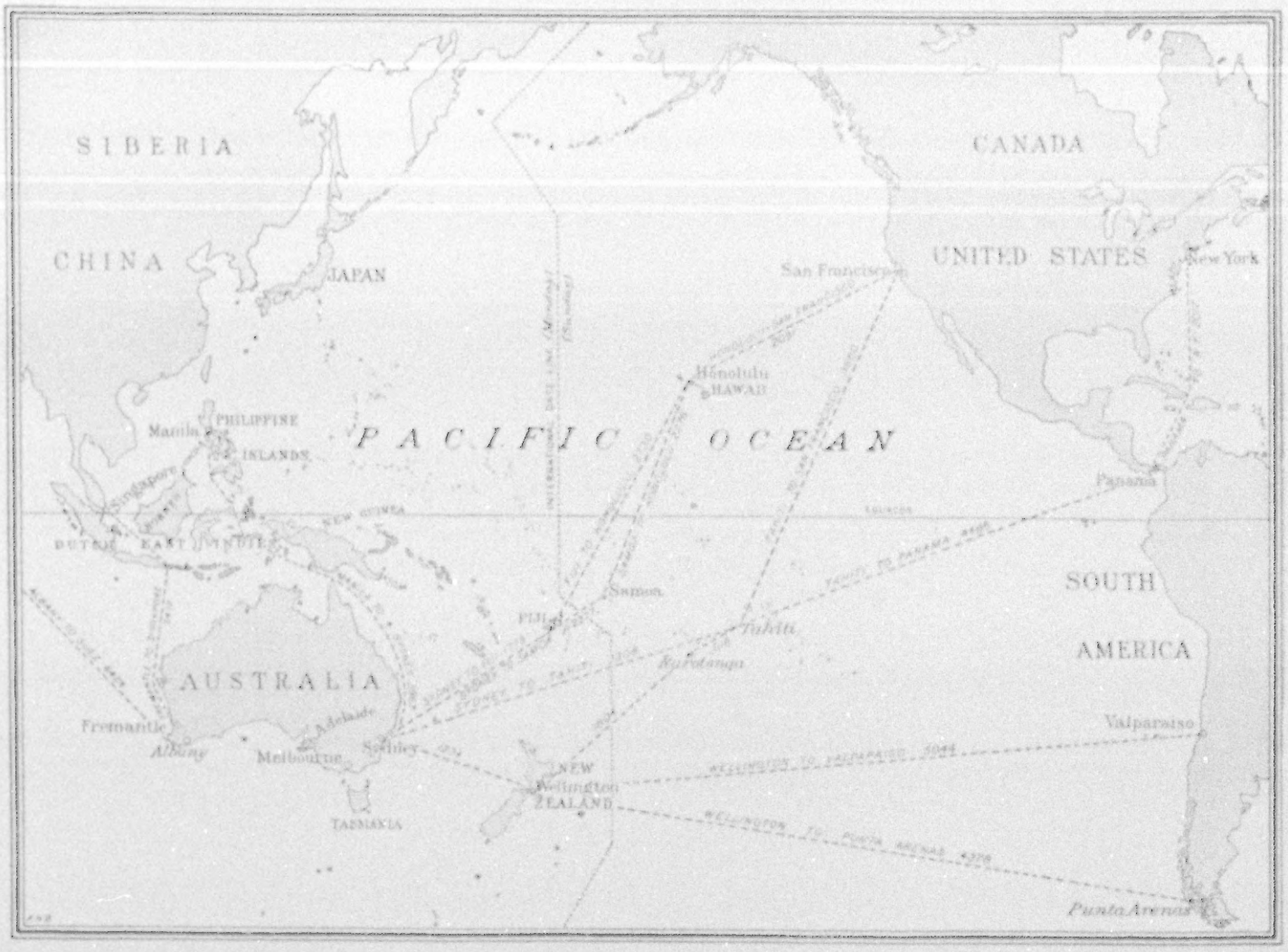
Four days' travel across a chilly sea is required for the traverse from Wellington to Sydney, and after exchanging the chill midsummer climate of the New Zealand Lake region for the heat of Adelaide, one readily accepts the evidence of the map that the southern coast of the Australian mainland has the latitude of central New Jersey, while the southernmost of the three islands which comprise the Dominion of New Zealand occupies the position of southern Newfoundland (see map, page 477).

In climate and vegetation the two dominions are as unlike as Norway and South Carolina. New Zealand is a land of mountains, gorges, rivers, and fiords. The higher peaks of the South Island are eternally snow-capped and the glaciers of its southern Alps rival those of Switzerland. The surrounding seas are too cold for corals. Among the mountains of the North Island volcanic fires are still active and the geysers and hot springs are little less impressive than those of the Yellowstone Park. The aboriginal inhabitants of New Zealand, at the time of their discovery by Captain Cook, were the most advanced of all the South Pacific races,



THE TWO BROTHERS ON BALD MOUNTAIN (4,070 FEET): SOUTH QUEENSLAND, AUSTRALIA

These relics of a bygone geologic age here appear in contrast with the white man. While the Caucasian history of Australia is only a little over a hundred years old, dating from the first settlement in 1788, when Botany Bay was colonized, its geological history ranks with the oldest on earth.



MAP SHOWING THE ISOLATION OF AUSTRALIA (SEE PAGE 473)

while the aborigines of Australia are the lowest in intelligence of all human beings.

Australia is in no sense inferior to New Zealand in geographic interest, but lofty peaks, profound canyons, and active volcanoes are lacking; its rivers are unimpressive and its permanent lakes small and few in number; it is a continent composed of plains interrupted by ridges and mountain knobs.

Unique vegetation of remarkable variety and beauty (see page 486), animal life of by-gone geological periods (see page 502), and an aboriginal population, the lowest in the scale of beings having human form, stand out as features distinctly Australian—a never-ending source of interest to the geographer.

Australia is a large country. It is about fourteen times the size of France or Germany, twenty-five times the size of Italy, Hungary, or Ecuador, and two and one-half times the size of Argentina! its chief competitor in the Southern Hemisphere. Its area is equal to three-fourths of Europe, one-third of all North America, and one-fourth of the British Empire.

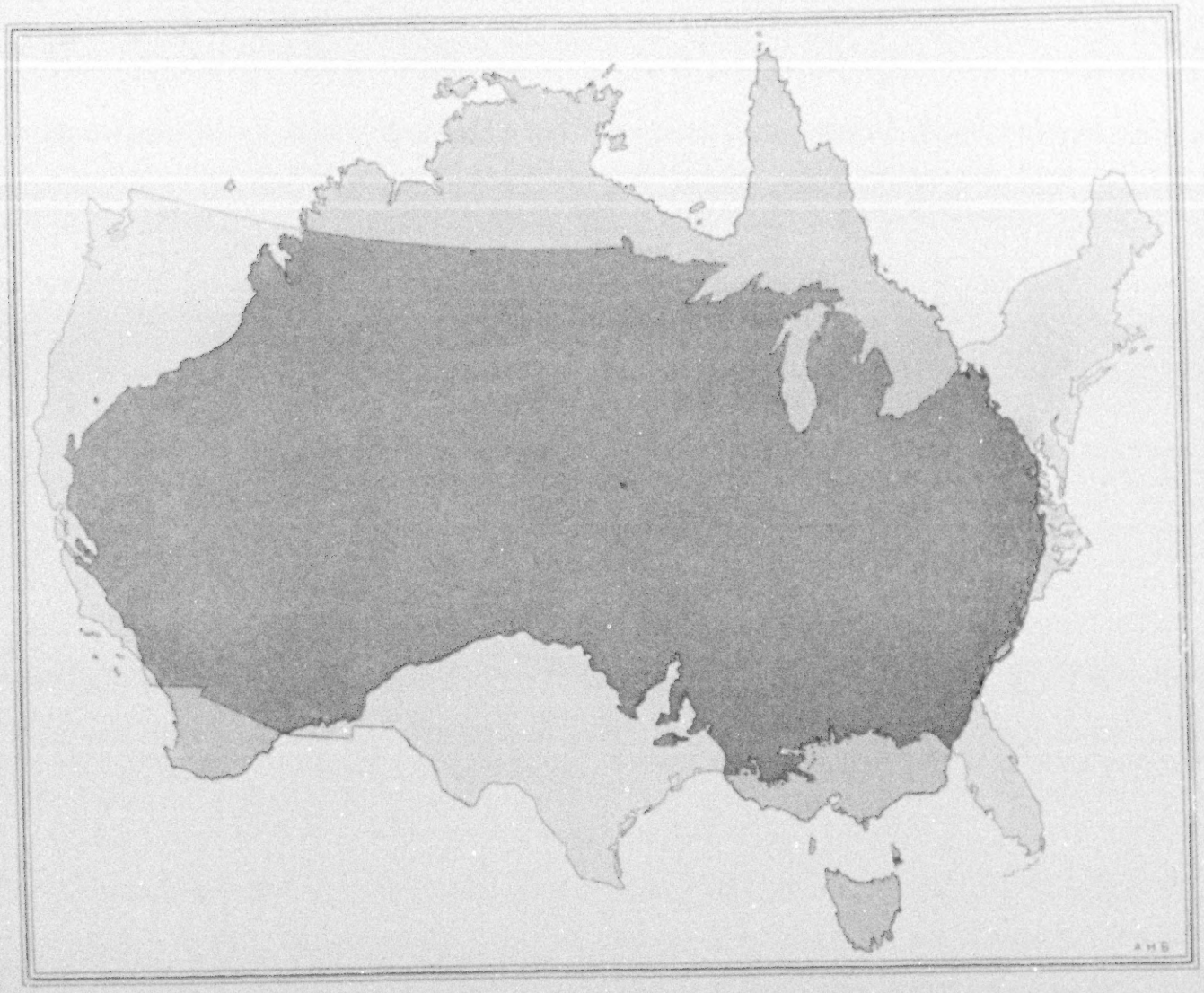
SOME COMPARISONS WITH THE UNITED STATES

The continent is almost exactly the size and is nearly the shape of the United States (see map, page 476).

Of outlying provinces, Australia has the tropical land of Papua to offset arctic Alaska. The Commonwealth is responsible also for the rich little Lord Howe Island and for 800 inhabitants of Norfolk Island, descendants of Tahitian women and British sailors—mutineers of the famous ship *Bounty*.

Australia is the most level in surface and regular in outline of all the continents, and even of most large islands. It is also the lowest continent, with an average elevation about that of Ohio. Its surface lacks variety. The change from one type of topography is so gradual and significant natural features are so few and so widely spaced that, with the exception of the Murray River, they are

XUM



OUTLINE MAP OF AUSTRALIA ON OUTLINE OF THE UNITED STATES, TO SHOW RELATIVE SIZES

If we except the lakes, the land area of the continental United States is 2,973,890 square miles, and of Australia 2,974,581 square miles, a difference in favor of Australia of 691 square miles.

not utilized in marking the boundaries of States.

Except for the low coastal mountains, the obstructions to transcontinental railroads from Queensland to Perth or from Port Augusta to Port Darwin are less than those between Pittsburgh and Denver (see also page 489).

The traveler in search of duplicates of the Canadian Rockies, the Yosemite, the Grand Canyon, of Norwegian fiords and Alpine scenery, need not visit Australia. Its mountain scenery is that of the southern Appalachians, the White Mountains, and the low ranges of Arizona. Its plains and plateaus are comparable with those of the Rocky Mountain foothills and the arid expanses of Utah, Idaho, and Oregon. The blunt granite cap of Mt. Kosciusko, 7,328 feet above sea, is the culminating point of land. A half dozen peaks reach the height of Mt. Washington, and something like one per cent of the entire land area rises as high as the Catskills.

Although the mountains are low compared with those of other continents, their influence is great, for nowhere is their control of rainfall and consequent distribution of vegetation and people better exemplified. A bird's-eye view of Australia shows a belt of vegetation extending along its north, east, and southeast edges, with a patch on the extreme southwest corner and another covering most of the island of Tasmania. In these regions the people live. The remainder of the big island presents an enormous expanse of brown and gray soils and rock, dotted with patches of vegetation on dunes and on isolated highlands and strips of green along watercourses.

The cause is not difficult to find. The trade winds abundantly supply the northeast coast, but carry little water beyond;

OUTLINE MAP OF AUSTRALIA SUPERPOSED ON OUTLINE OF PART OF NORTH AMERICA OF SAME SCALE, IN CORRECT LATITUDE

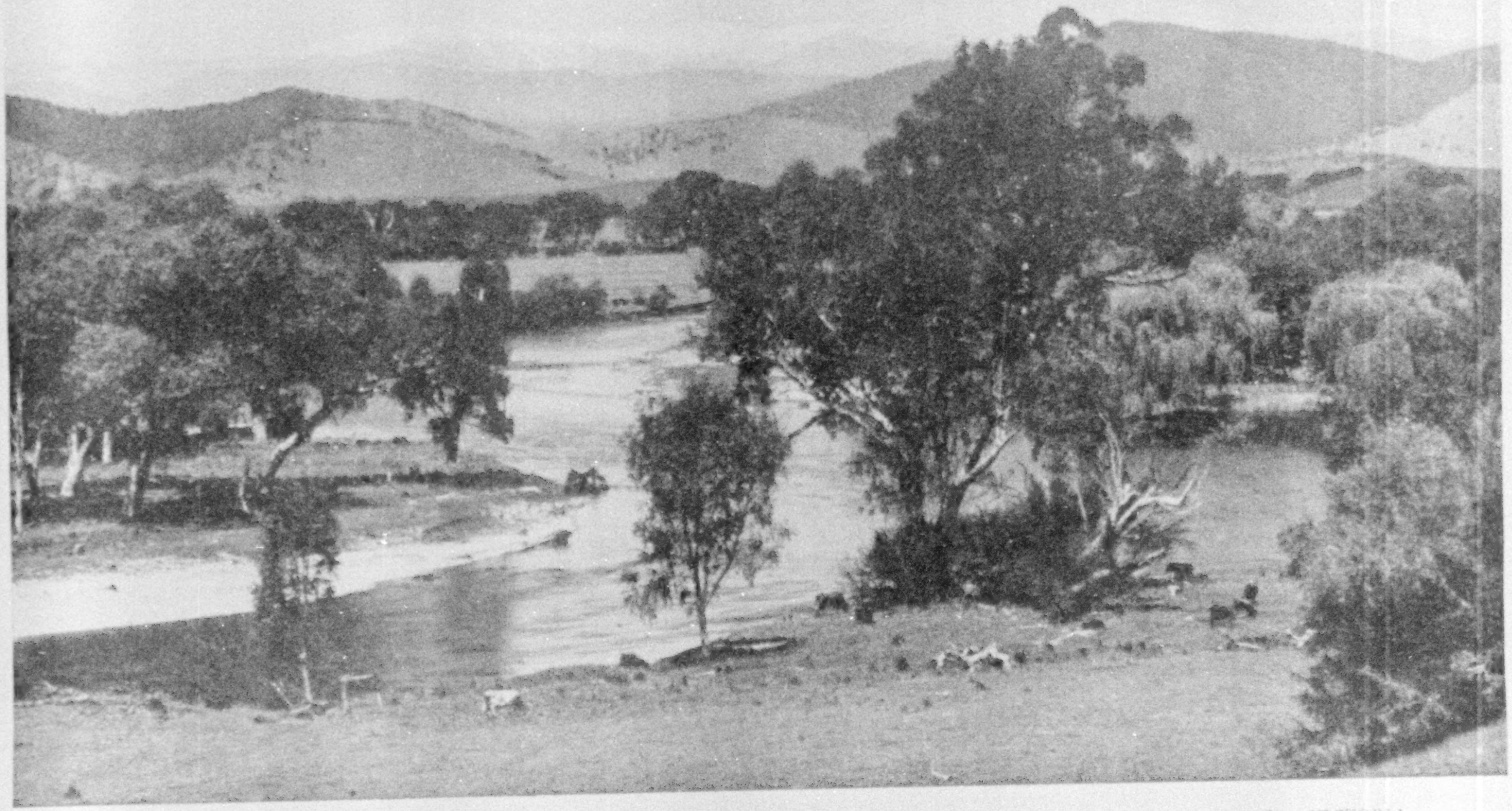
Only one-twentieth of the total area of Australia lies in a latitude farther removed from the Equator than Chattanooga, Tennessee, Clarendon, Texas, and Albuquerque, New Mexico. Considerably less than one-third of its area lies in a cooler latitude than the sugar-cane lands of Louisiana.

the westerlies, the "roaring forties" of the sailor, deposit their moisture on the lands along Bass Strait and on the southwest tip of the continent, but have little or none to carry inland. The north coast is alternately drenched and dried with the coming and going of monsoons. The center of the continent is therefore arid, large parts are desert, and the numerous large lakes shown on the map are expanses of salt mud covered with water by infrequent rains (see page 488).

Australia's streams are fewer and carry less water than those of any other continent.

AUSTRALIA HAS NO RIVERS LIKE OURS

There are in Australia no Colorados or Columbias or Tennessees, trenching plateaus and crossing mountain chains, and no counterparts of the thousands of spring-fed brooks and streams issuing from lakes widely scattered over the country. The St. Lawrence system of lakes and rivers of large volume and steady flow is the very antithesis of anything found in Australia. The large area in Utah and Nevada from which dwindling streams never escape to the sea is represented in Australia by an enormous



THE HIGHEST PEAK IN AUSTRALIA, MOUNT KOSCIUSKO (7,328 FEET), AND THE UPPER MURRAY RIVER: VICTORIA

expanse of territory, comprising fully half of the continent.

The heart of the United States is a well-watered land of fields and woods and cities; the corresponding part of Australia is dry and barren and thinly populated.

The Murray-Darling is the one great river system of Australia. From the source of its uppermost branch, the Condamine, in the highlands of Queensland, 80 miles from the edge of the continent, to its mouth, through the sand reef of the Coorong, the stream travels 2,310 miles, receiving supplies from 414,000 square miles of land. It drains five-sixths of New South Wales, more than one-half of Victoria, and nearly one-seventh of the entire Australian Continent (see map on pages 480-481).

In relative length and area drained, it is the Missouri-Mississippi of Australia; but in other respects the two systems are quite unlike. The Mississippi, whose basin occupies nearly three-sevenths of the United States, flows through the heart of the country and receives abundant water from mountains on either side. The Murray is on the edge of the continent, far removed from the interior; its course lies between well-watered highlands on the east and arid plains on the west. The Mississippi receives supplies from nearly every part of the 1,250,000 square miles of its basin; the Murray receives effective contributions from only 160,000 square miles; from the remaining 254,000 square miles the water is lost before it enters the main stream, and the dry air abstracts further toll from the river itself.

Instead of a delta pushed out to sea, the Murray terminates in a lagoon inclosed by a barrier of sand pierced by an inlet with scarcely seven feet of water.

Because of its unfavorable outlet, its small volume, its snags and sand-bars and great sinuosities, navigation of the Murray is limited to small, light-draft steamers towing one or two barges. Regular traffic in grain and wool is maintained during seven months of the year from the mouth of the river to Wentworth, 500 miles, and small boats reach Albury.

During times of exceptional floods boats have reached Walgett on the Darling, 1,900 miles from the sea. In the flood year of 1870 a steamer went beyond the Queensland border along a river 60 miles wide, and in 1890 steamers on the Darling between Wentworth and Burke "traveled for hours without seeing any land, and in one instance discharged cargo 25 miles from the ordinary channel of the river." But a few years later (1902-1903) the Darling ceased to flow for eleven months. During exceptional years the bed of the Murray is partly dry and the waters near its mouth become too salt for stock.

THIS GREAT CONTINENT WAS NOT DISCOVERED UNTIL JUST BEFORE OUR REVOLUTION

That the size and form of a land-mass nearly as large as Europe should have remained unknown until 1770 is most remarkable.

Louis de Torres, sailing from Peru (1606), thought the northern Queensland coast another of those island groups (Marquesas, Solomon, New Hebrides) through which he had passed. The Dutch proceeding from Java several times met the west and north of Australia, but learned little regarding the land. They reported a "barren," "wild" country, inhabited by "barbarous," "cruel," "black" people. Abel Tasman, in 1642, found Van Diemens Land, Tasmania, which he left in disgust. Following the westerly winds he sailed east, found New Zealand, but missed the Australian coast.

In 1688 William Dampier, an English buccaneer, landed in West Australia, and the following year mapped the coast, which he described as "sandy and waterless," with stunted trees, inhabited by "the miserablest people in the world."

These early explorers were singularly unfortunate in the route which they traversed. They visited the tropical belt of northern Australia, the inhospitable shores of western Australia, and sailed along the southern coast, where cliffs prevented landing and where for a distance of nearly 1,000 miles no water was procurable other than that from their ships. The attractive parts of the country were not seen at all. Small wonder that little

SUNDA ISLANDS
Timor
Kupang
Sandalwood Island
Melville Island
Bathurst I
ARNHEM LAND
TIMOR SEA
INDIAN OCEAN
Cape Londonderry
Queens Channel
Victoria R
King Sound
Collier Bay
NORTHERN
Kimberley
Halls Creek
Goldfield
Broome
Fitzroy R
DESERT
GREAT SANDY
TERRITORY
Soda Spring
Salt Sea
Condon
Damper Archipelago
Cossack
De Grey R
Marble Bar
L. White
Pilbarra
Pilbarra Goldfield
Nullagine
Ten Spring
N.W. Cape
WESTERN
Ashburton
Ashburton R
Goldfield
Springs
Dry Lakes
L. Macdonald
Glen Emily
L. Amadeus
Carnarvon
GIBSON DESERT
Gascoyne R
Augusta L
Sharks B
Meekatharra
L. Way
L. Wells
Flemming
Alberga R
Murchison
Murchison R
Lake Austin
L. Darlot
L. Baron von Müller
SOUTH
Goldfield
AUSTRALIA
GREAT VICTORIA DESERT
Salt Lakes
Northampton
Geraldton
L. Barlee
Laverton
L. Carey
Salt Lakes
L. Monger
SALT LAKES
Dry Salt Lakes
AUSTRALIA
L. Moore
Kalgoorlie
Coolgardie
Yilgarn
NULLARBOR PLAIN
Olden
L. Cowcowing
Southern Cross
Eucla
L. Everard
Northam
Goldfield
L. Cowan
York
Perth
Fremantle
DARLING RANGE
Norseman
GREAT AUSTRALIAN
BIGHT
STIRLING RANGE
Bunbury
Busselton
Cape Leeuwin
Port Augusta
Albany
Statute Miles

Torres Strait
Cape York
CAPE YORK PENINSULA
GULF OF CARPENTARIA
Groote Eylandt
Port Moresby
NEW GUINEA
PAPUA
PACIFIC OCEAN
GREAT BARRIER REEFS
Cooktown
Cairns
Wellesley Island
Normanton
Croydon
Georgetown
Townsville
Bowen
Ravenswood
Mackay
Hughenden
Cloncurry
Urandangie
QUEENSLAND
Winton
Clermont
Longreach
Barcaldine
Rockhampton
Emu Park
Gladstone
Tropic of Capricorn
Bundaberg
Great Sandy Island
Maryborough
Gympie
Charleville
Roma
Toowoomba
Brisbane
St George
Cunnamulla
Warwick
Ipswich
L. Eyre
L. Gregory
L. Frome
Moree
Tenterfield
Ballina
Glen Innes
Grafton
Bourke
Narrabri
Armidale
Gunnedah
Tamworth
Kempsey
Silverton
Broken Hill
Cobar
Nyngan
Port Augusta
NEW SOUTH WALES
Wellington
Mudgee
Newcastle
Forbes
Bathurst
Orange
Lithgow
SYDNEY
Liverpool
Kiama
Port Pirie
Adelaide
Hay
Young
Goulburn
Wagga Wagga
Albury
Kangaroo I
Bendigo
VICTORIA
MELBOURNE
Geelong
Ballarat
Portland
Mt Gambier
Sale
Bairnsdale
Port Albert
TASMANIA
Same Scale as Main Map
Bass Strait
King I
Launceston
Zeehan
Hobart

XUM

Photograph by Norman Thomas

PERTH, THE CAPITAL OF WEST AUSTRALIA, AND SWAN RIVER

Upon the opposite edge of the Australian Continent, 2,000 miles almost due west from Sydney, is Perth, the capital of Western Australia, a city of perhaps 50,000 inhabitants. A little to the south is Cape Leeuwin, the first land seen by the traveler sailing to Australia via the Suez Canal and through the Indian Ocean, which received its name from the little Dutch ship which discovered it, the name of whose commander is lost (see map, pages 480-481).

XUM

A SAILING RACE OF 12-FOOT BOATS: SYDNEY HARBOR, NEW SOUTH WALES

The history of Australia begins with the year 1788, when 1,035 convicts were landed at Sydney Cove, the first settlement of white men on the continent. In natural advantages Sydney's harbor is unsurpassed on the North Atlantic coast (see page 485).

THE NATIONAL ART GALLERY OF SYDNEY

Sydney is the seventh city in size in the British Empire, being exceeded only by London, Calcutta, Bombay, Glasgow, Liverpool, and Manchester. It is about the size of Boston or St. Louis, two of the five largest cities of North America. Its population is exceeded in the Southern Hemisphere only by Buenos Aires and Rio de Janeiro.

was heard of the Great South Land for nearly one hundred years after Dampier made his official report to King William.

One is minded to compare the experiences of these Pacific navigators with those of the discoverers of North America. The English and Dutch, like their predecessors, the Spanish, found the North Atlantic seaboard "pleasant land," well watered, clothed with vegetation, with obviously fertile soil, inhabited by a virile race. If Columbus had first landed on the barren shores of Lower California, explored the Gulf of California, and sent scouts into the Sonoran and Gila deserts, the story to be told of a new world would have had a far different wording.

The uncertainty surrounding the distribution of land in the South Pacific was dissolved by the English scientific expedition of 1768-1770, under Captain Cook. After circumnavigating the islands of New Zealand, Cook set his course westward toward Tasmania, but, luckily, was carried by storm winds to the east coast of Australia. Proceeding northward, he discovered the Great Barrier reef, and passed through Torres Strait, proving Australia to be a land-mass of great dimensions. Cook's expedition revealed for the first time the presence of wide belts of fertile land in Australia, and his landing at Botany Bay, Sydney, April 28, 1770, was destined to result in acquiring a continent for the British Crown.

THE SETTLEMENT OF AUSTRALIA RESULTED FROM THE AMERICAN REVOLUTION

Curiously enough, the establishment of the first colony on the new-found continent is an episode in the history of the United States. It was proposed by the British Government to utilize the land as a home for the "Loyalists" (Tories) who found life in the American Colonies uncomfortable at the close of the Revolutionary War. They were to be supplied with land and money, and Malay slaves or English convicts were to be provided as laborers.

Fear of the French fleet and the removal of many Tories to Canada led to the abandonment of this scheme, but another use for Botany Bay was soon discovered. Place must be found for undesirable citizens, who, before the Revolution, had been sent to America at the rate of one thousand a year, and New South Wales met the requirements. The history of Australia begins with the year 1788, when ten hundred and thirty-five convicts under military escort landed at Sydney Cove.

In looking back over the history of the original settlement at Sydney, at first it seems strange that the base of the Blue Mountains, a plateau 3,000 feet in height and a day's ride from the coast, should mark the edge of known land for twenty-five years after colonization.

There are, however, good reasons for this seeming lack of enterprise. The Blue Mountains, though not lofty, are broad, and constitute a formidable barrier. There are no long valleys heading in practicable passes and furnishing access from the east and the west; the stream heads are boxes inclosed by walls, and it was only when the narrow divides were chosen for causeways that the passage of the mountain was successfully accomplished (see page 487).

The famous "zigzags" of the first railroad, now replaced by a dozen expensive tunnels required for the precipitous descent of 2,000 feet, give even the casual tourist an impression of the ruggedness of the plateau; and when one is led out onto one of a hundred flat-topped promontories and gazes down into canyons whose walls may be scaled only by an experienced mountaineer and looks out over a tangle of canyons and cliffs and tables at lower levels, he realizes that "magnificent scenery" for the present generation must have been "disheartening obstacles" to the scout in search of tillable land.

It is as if the only feasible crossing of the Appalachians which confined the American colonists to the coastal belt were through the most rugged portion of West Virginia rather than along the Mohawk or through the Cumberland Gap.

The drought of 1813 appears to have been the force which compelled the leaders of the now prosperous colony to undertake a systematic search for new lands among and beyond the barriers which held them close to the sea.

The history of the effort to discover what lay back of these coastal regions in the "land of the never-never"; to find the

XUM

nature and extent of the heritage now firmly in English hands is a disheartening but fascinating story. Whatever route was chosen the results were the same: tales of hardship and disaster and reports of no good land.

TALES OF UNSURPASSED COURAGE

One of the most dramatic incidents was the discovery of the Darling River by a group of worn-out, disheartened men traversing a scorched, waterless plain. A great river was found, but its waters were salt! The experience of Sturt's men carried involuntarily through the gorge of the Murrumbidgee into the broad channel of the Murray; their journey to the sea down an unknown river which followed an undreamed course, and their arduous return up 800 miles of current, with the scantiest of fare and amid hostile blackfellows, constitutes a record of endurance and resource comparable with Powell's descent of the Colorado canyons.

Parties from Sydney found little of value beyond the Darling; Bourke and Wills from Melbourne perished of starvation on Cooper Creek. Leichhardt disappeared utterly. From Port Lincoln and Adelaide, Eyre traversed the coast of South Australia, finding only three waterholes in 300 miles, and penetrated to the center of that State only to discover its watercourses dry and its lake beds coated with brine. Stuart, in 1862, succeeded in making a complete traverse of the continent from south to north, but found little on which to base the nation's future.

From the tropical portions of the Commonwealth came the same tale. The settlement established on Melville Island in 1824 was abandoned in 1829, in spite of the rich soil, good surplus of fresh water, and abundance of tropical fruit. Fort Wellington, on Raffles Bay, retained its colonists for only three years. Kennedy, on York peninsula, was killed by the natives; his companions starved to death.

As a record of human endeavor the explorations of Australia during these years constitute a chapter in history for which the United States has no parallel. The pioneers who crossed the Alleghanies found fertile country beyond; the trappers and traders on our northern boundaries were in country abundantly supplied with food and water; the men who pushed their way across the great plains had forage and water for their animals and wild game for themselves. The forty-niners who crossed the deserts of Utah and Nevada were encouraged by knowledge of California beyond. Only the Spanish explorers from Mexico and pioneer travelers through the deserts of Arizona and southern California can appreciate the suffering and understand the failures of the heroic Australian scouts.

To the colonists grouped about the five cities on the mainland the results of these explorations between 1840 and 1860 must have been disheartening. The center of the great continent, which their hopes had pictured as grass-covered plains, fertile valleys, lakes, and timbered highlands, interspersed perhaps with arid stretches, had turned out to be one of the most extensive deserts in the world, into which streams rising near the coast were lost in a sea of rock and sand.

It is as if the people of the United States should wake up some morning and find that all the land between the Alleghanies and the Sierra Nevadas had been converted into plains like the arid stretches of Utah.

However, persistent explorations gradually disclosed to the Australians that their continent, in spite of its arid expanse, had well-watered agricultural lands for many millions of peoples, and that the resources in timber and ores and grazing lands were unusually large.

FORESTS OF ANCIENT LINEAGE

To me the most lasting impressions of Australia are of its wonderful woods. One readily understands why the Australian loves his trees. The groves of giant eucalyptus form pictures never forgotten, and the scent of the wattle brings a homesick feeling like the smell of the sage to a Westerner.

The flora is not only beautiful, it is unique, and has no counterpart in other lands. Of the 10,000 species of plants most of them are purely Australian, and are unknown even in New Zealand. The general impression one gets of Australian

A ROAD SCENE NEAR GRAND ARCH, JENOLAN CAVES, NEW SOUTH WALES

For many years the beautiful Blue Mountains of New South Wales were a barrier to the interior for the early colonists. With many mouths to be fed, an extension of territory became imperative, and an expedition under the leadership of a Kentish farmer, George Blaxland, for whom Mt. Blaxland was named, found a way through the mountains to the fertile country beyond. Now motor-cars glide through these mountains over smooth roads and tourists stop off en route to see the wonderful Jenolan Caves with their remarkable stalactitic formations.

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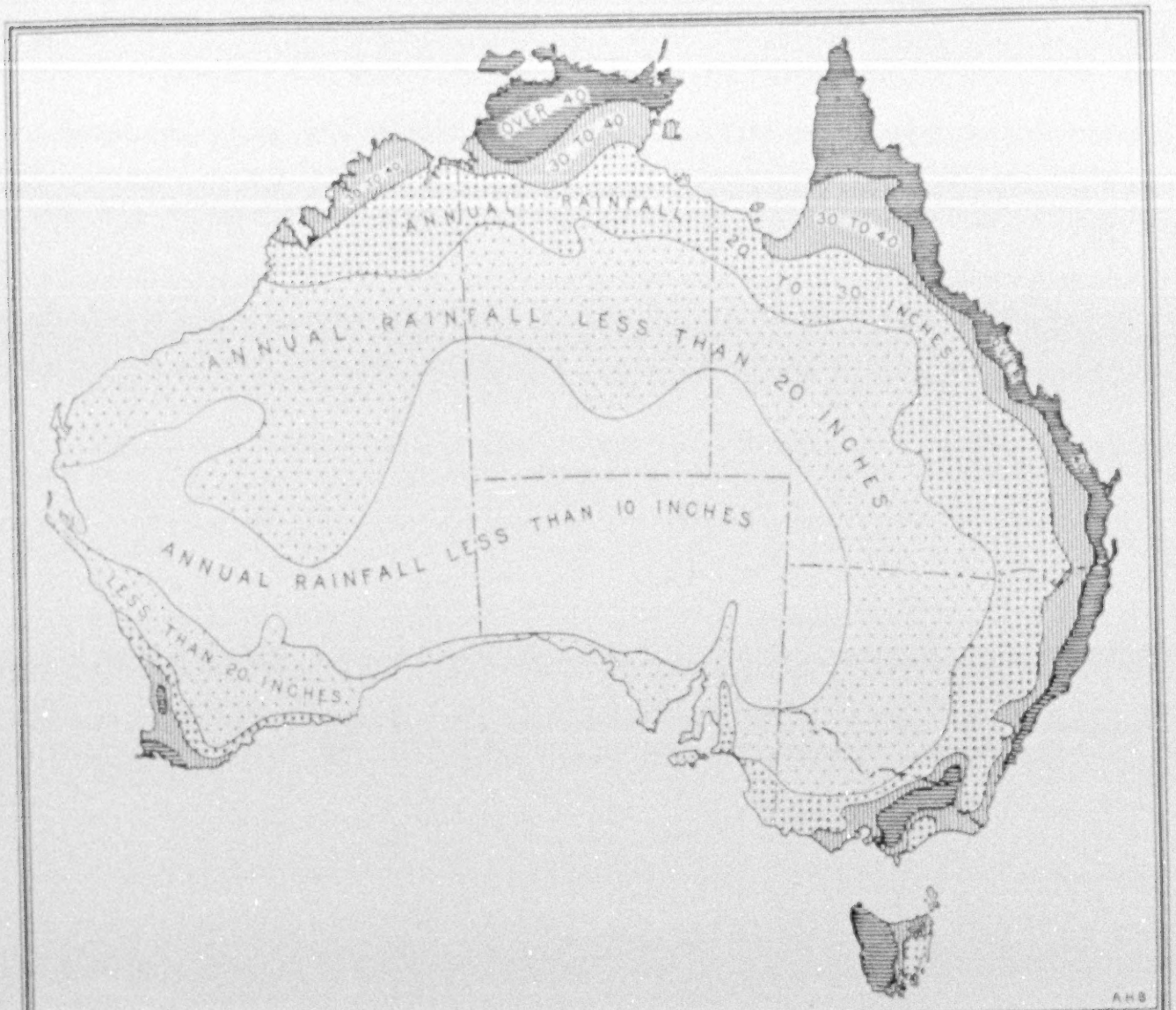


A MAP SHOWING THE RAINFALL IN AUSTRALIA

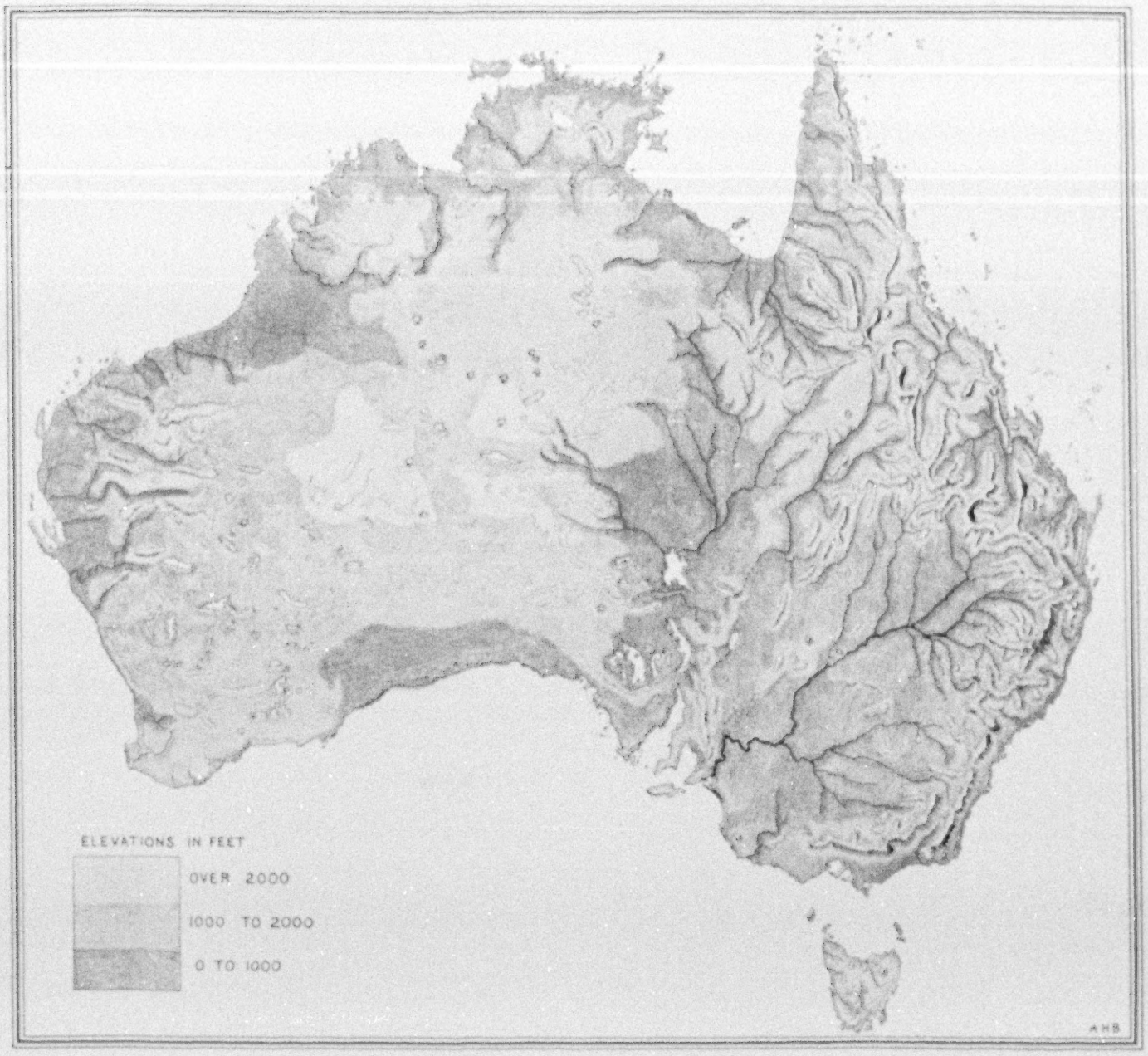
More than two-thirds of the territory of Australia has less than twenty inches of rainfall a year. Washington, D. C., has 43 inches; Boston, 43; Chicago, 33; Kansas City, 37; Atlanta, 49; New Orleans, 57; Denver, 14; San Francisco, 22, and Seattle, 36. Being without high mountains, the continent has no summer snows to melt, which renders irrigation, except by artesian wells, almost impossible. Fortunately the configuration of bedrock makes artesian irrigation possible in many places, though the water so obtained is usually brackish.

forests is their total unlikeness to anything seen elsewhere. The great forests of timber trees are not damp and shaded and all of one species, but are well lighted and filled with other forests of shorter trees; in places the woods consist of large widely-spaced trees surrounded only by bunch grass, and even in areas where water is not to be found on the surface for hundreds of square miles true forests of low trees are present.

Forms which may be recognized as tulip, lily, honeysuckle, and fern take on a surprising aspect. They are not garden flowers, but trees, and the landscape of which they form a part reminds one of the hypothetical representations in books of science of a landscape of Mesozoic time, a period antedating our own by millions of years.

The trees are indeed those of a bygone age. In America and Europe shadowy forms of fossil leaves of strange plant species are gathered from the rock and studied with interest; in Australia many of these ancient trees are living. The impression that one is looking at a landscape which has forever disappeared from other parts of the world is so vivid that the elms and maples and oaks in some of the city streets strike a jarring note. The transition from Jurassic to modern times is painfully abrupt.

With a flora of such great interest, it occasions no surprise to find that Australia is the home of many eminent botanists,



PHYSICAL MAP OF AUSTRALIA

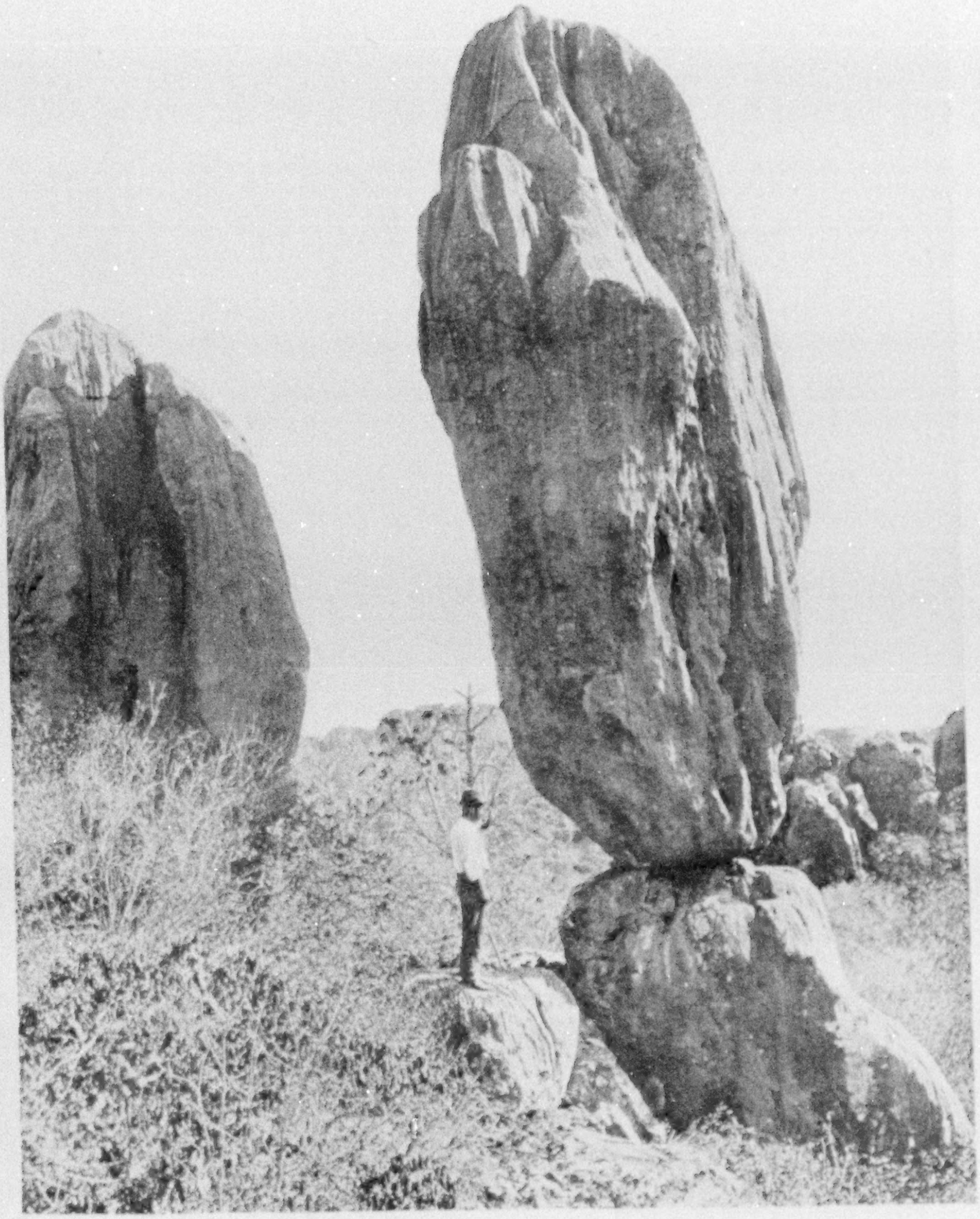
The very small area in Australia having an elevation of more than two thousand feet is clearly shown. Perhaps more striking even than this is the fact that, except for a very tiny area lying back of the coast in the southeast corner, there are no elevations exceeding four thousand feet.

and that geologic history is a common subject of study in schools; but I sometimes wonder why the kangaroo and emu occupy the commonwealth coat of arms to the exclusion of the gums and the wattle, about which the finer sentiments of Australia center.

AUSTRALIA'S NATIONAL TREE

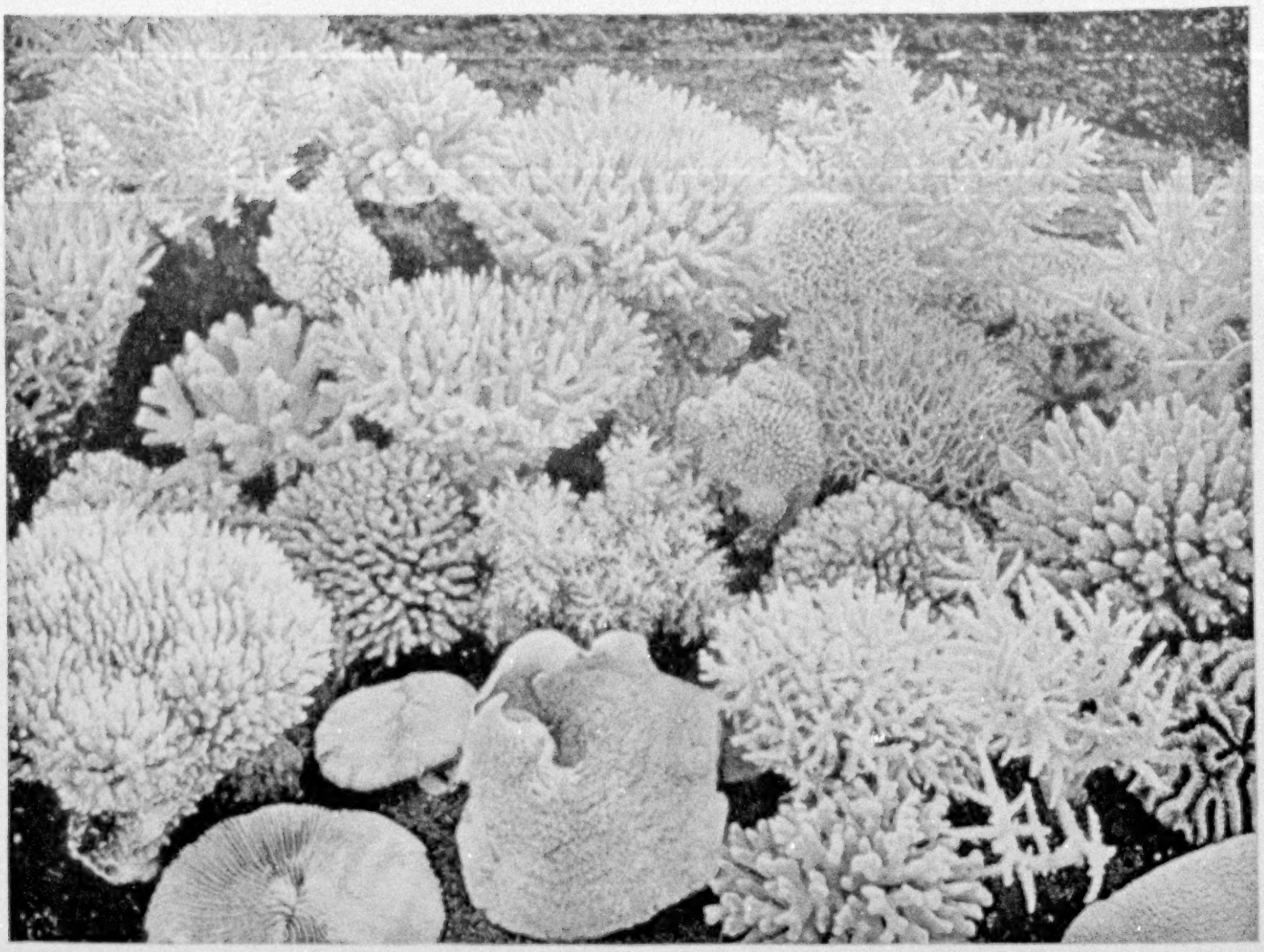
Australia is the home of the wonderful eucalyptus, a tree about which a fair-sized library of books and pamphlets has been written, without exhausting the subject. For geological ages the eucalypts have remained undisturbed in this "biological backwater," and, spreading over the continent, have adapted themselves to many varieties of soil and climate and elevation. About 300 species have already been discovered in the small part of the continent explored by botanists.

It is a hopeless task for the tourist to gain an acquaintance with this national tree. As we passed through woods and open spaces, seeing trees of widely different aspect—different in form and method of branching, different in color and kind of bark, different in shape and size and color of leaf, some oozing gum, others clean and dry—it was disconcerting to be quietly told by our botanist-guide that this surprising array of trees "includes only varieties of the genus eucalyptus." It is as if the traveler in New England were



BALANCING ROCK: NEW SOUTH WALES

Australia is a land of the strange and curious, unlike any other on earth. While both its fauna and flora are unusual to a startling degree, its geology is unique. Science claims for it the distinction of being one of the oldest land surfaces.



CORALS FROM THE AUSTRALIAN BARRIER REEF, NORTH QUEENSLAND

Ages of time and the lives of myriads of coral polyps have gone to make up countless forms like these in the Great Barrier Reef off the coast of Queensland, the largest coral formation in the world, 1,200 miles in length. The explorer Captain James Cook almost lost his ship on the reef in 1870; but today, when the openings through it are known and charted, as well as the channel which it protects, the barrier is regarded as a boon to coasting vessels.

told that all the maples, oaks, chestnuts, elms, birches, and cedars, and even apples and cherries, were but species of the genus hickory.

The Australian is likewise embarassed by these prolific variations of eucalyptus. The trees in general are "gums"—white gums, red gums, blue gums, spotted gums, cabbage gums—or ironbark, stringy bark, woolly bark, smooth bark, and when distinctions are necessary we get such combinations as narrow-leaved-red-ironbark, or broad-leaved-yellow-stringy-bark.

LEAVES THAT GROW VERTICALLY INSTEAD OF HORIZONTALLY

Where conditions are favorable, the eucalypts form forests of straight, slender trees; where soil is poor, they are wide-spaced and branch like the California oaks; on sand plains they develop an enormous root, from which spring a number of thin round stems leading to a canopy of scattering leaves; and even where soil and rain are practically absent the genus is represented.

Eucalypts are evergreens, which shed their bark, but not their leaves; but they are not shade trees. The leaves are placed in inclined rather than in horizontal positions, and the passage of light is but little obstructed. For this reason, smaller trees and bushes and grass grow underneath, and the woods in places assume the appearance of a jungle from which arise the towering shafts of trees. It is interesting to note that primitive types of eucalyptus, as well as the young of more modern types, have horizontal leaves, pointing to a time in the geologic past when the climate was more congenial and no precautions to conserve moisture need be taken.

The eucalypts include some of the tallest trees in the world. The Victorian Forests Department records trees which

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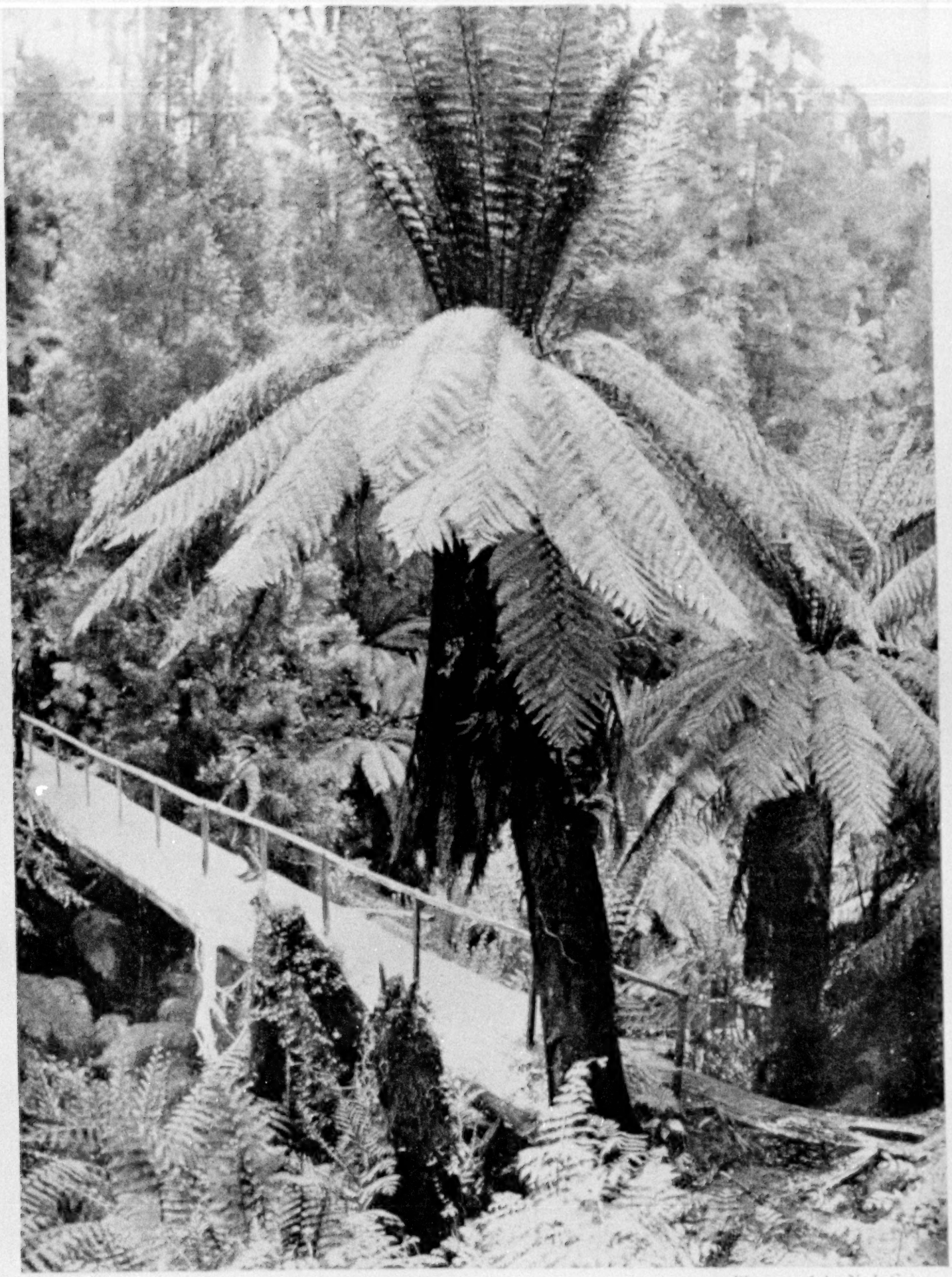
Photograph from Janet M. Cummings

A FERN-TREE GULLY IN VICTORIA, AUSTRALIA

No other continent is so rich in ferns as Australia. Just as its long isolation kept out the animals of other continents and allowed species of old geologic ages to persist, so also that isolation has resulted in the continuance of plant forms there that have lost the race for existence in other continents. Among these are some of the great tree ferns that are met with elsewhere only in fossil form.



Photograph by N. J. Caire

GIANT TREE BRIDGE OVER RIVER TARWAN; GIPPSLAND, VICTORIA

Australia's trees are largely forms that lived and became extinct in our own land more than one million years ago

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A FOREST SCENE (GROUP OF TURPENTINE TREES): NEW SOUTH WALES

Eucalyptus trees grow about seven times more rapidly than oak or hickory, and they also reproduce themselves even more readily than these popular American trees. Their strength is twice that of the English oak. Note the man.

measure 329, 333, and 342 feet, and states that there are "scores of trees about 300 feet in height." The surveyor of the Dandenong ranges made notes of the tallest trees felled during an eight-year period and reports that "all those measured were over 300 feet in length."

Eucalyptus trees reproduce themselves readily and grow about seven times more rapidly than oak or hickory. From a ton of bark of the gimlet tree was obtained by analysis 416 pounds of tannin extract and 308 pounds of oxalic acid. From the gum and leaves of these trees come also the highly valuable eucalyptus oils, from which no less than twenty-seven constituents have been distilled for pharmaceutical purposes and for the separation of metals by the flotation process.

The eucalyptus is the great timber tree of the continent. Of sixty varieties in Victoria, twenty have high commercial value and are finding an ever-increasing market. The Tasmanian blue gum is one of the strongest, densest, and most durable woods in the world. Timbers 2 feet square, exceeding 100 feet in length, are readily obtained, and, when used for piling, need not be weighted, for the density of the wood is such that it sinks in water.

THEIR STRENGTH REMARKABLE

Their strength is twice that of English oak, and they are practically immune from attack by the Teredo, which plays such havoc with ordinary timbers. In Tasmania railroad ties or paving blocks of blue gum and stringy bark have a life of fifteen to twenty years—three times that of ordinary woods. In the dryer climate of Victoria blue-gum sleepers have been in service for nearly forty years. Shingles from peppermint gum have a life of thirty to forty years.

The jarrah, a eucalyptus of West Australia, is another famous tree. It is one of the few woods of the world which successfully resist the ravages of white ants; it is practically immune from the attacks of marine borers, and, like the iron bark of Victoria and New South Wales, has been known to withstand fire better than iron girders. Piles of sawn jarrah driven at Port Adelaide in 1868 "showed no signs of decay in 1910."

The forests of West Australia also supply the karri, one of the world's big trees. It is straight and tall, reaching heights of 300 feet and 120 to 180 feet to the first branch. Like the jarrah, its timber is widely used where strength and durability are requisites. The karri planking of a dismantled ship, which had plowed the seas for thirty years, was sawed into blocks and used for paving. A log of karri which had lain forty-six years in mud below high-water mark was found by a Royal Commission to be "perfectly sound." Their life as railroad ties is twenty-five to thirty-five years.

AUSTRALIA DESTROYING HER TREES

In view of the present and prospective value of Australia's national tree, it is a little surprising to find that cutting and burning is proceeding with scant scientific supervision. California and South America are planting eucalypts; Australia is cutting them down.

Australian hardwoods rival mahogany in beauty and susceptibility of polish, and are unsurpassed among the world's timbers in strength, durability, and resistance to fungous and insect attacks.

But soft woods for ordinary construction purposes are not abundant, and the imports of lumber are correspondingly large. During 1913 timber to the value of $10,000,000 reached the commonwealth from foreign parts, 70 per cent of it from the United States; in return, Australia exported undressed hardwoods of about half that value chiefly to New Zealand, South Africa, India, and England.

One effect of the scarcity of suitable lumber is shown in the extensive use of galvanized iron in building. Iron replaces shingles for roofing, and in parts of the country practically no other building material is used.

THE ANIMALS OF OTHER CONTINENTS—HORSES, CATTLE, PIGS, TIGERS, LIONS—UNKNOWN IN AUSTRALIA

The animals of Australia are so distinct from the rest of the world that some have proposed two great zoölogical realms: Australian and non-Australian. The peculiarity lies not only in the fact that Australian types are not found elsewhere, but also that families like the cats and

FOREST TWINS: AN IRONBARK AND A SPOTTED GUM

The ironbark is a species of the eucalyptus, very highly prized in work requiring great strength and durability. Often it is preferred to steel and iron for girders and supporting columns, since it is almost impervious to fire and does not bend or buckle when exposed to unusual heat.

the pigs, which are found native on all other continents and on many islands, are absent from Australia.

The continent has so long been isolated that the passage for animals from other land-masses has been closed for millions of years. Species and genera have evolved, and some even disappeared, in other continents, while Australia remained apart, and so it comes about that most of the forms known in other lands are represented neither by living nor by fossil species. The barrier of water which protects Australia from animal immigrants from other countries was formed at the beginning of the "Age of Mammals," before the prominent elements in the world's fauna—cats, swine, horses, cattle, sheep, elephants, camels, rats, rabbits, bears, monkeys, etc.—had originated. These, therefore, are not native to Australia, which possessed mammals of only the most primitive types.

THE WORLD'S STRANGEST ANIMALS

The great animal groups—the lizards, tortoises, snakes, birds, fishes, crabs, etc.—which developed in geological periods before the land bridges to other countries had been destroyed, are represented in Australia, but they have evolved along distinct lines, and most of the genera and species are peculiar to the continent.

The most primitive order of mammals, the monotremes, are confined to Australia. There is the platypus, a strange beast which lays eggs like a turtle, but suckles its young; has horny pads for teeth and a bill like the duck; its front feet are webbed, and both back and front feet have claws. Little wonder that he has received many names, or that his scientific designation is *Ornithorhynchus paradoxus* (see page 502).

The spiny ant-eater is another strange mammal. He looks and acts like a hedgehog, but he has a long beak and a longer tongue, covered with a sticky substance, with which he captures quantities of ants. He not only burrows vertically into the ground with great rapidity, but also climbs with surprising agility. Like the platypus, the spiny ant-eater lays eggs which are hatched in a pouch and the young reared on the mother's milk.

The kangaroo is Australia's national animal, and the group to which it belongs, the marsupials, is typically Australian. Marsupials—mammals whose young are born very immature and then transferred to a pouch and suckled—have been long extinct in Europe and are represented in America by unimportant survivors, like the opossum. They belong to a past geological age, and have survived and flourish in Australia only because the entrance of carnivorous beasts has been barred by the protecting zone of water. Primitive forms have been allowed to persist, and degenerate forms have not been eliminated.

COUSINS OF OUR 'POSSUM

Like the eucalyptus of the plant world, marsupials have dominated the animal kingdom of Australia, and in their adjustment to a varied environment have evolved species very unlike in form and manner of life. In size they range from the giant kangaroo, the height of a man, to creatures no larger than mice, and extinct forms include diprotodon as large as a rhinoceros, kangaroos more than 10 feet high, and a huge carnivorous beast as big as a polar bear.

Some marsupials live in trees; others roam the woods or desert; still others burrow in the ground. Some species eat grass; others live on leaves. One large group is carnivorous, eating flesh or insects; another eats food of all kinds. Some are nocturnal; others seek their food by day.

AN ANIMAL WITH FIFTY-FOUR TEETH

The Tasmanian devil is a ferocious beast; other forms are harmless, and some are affectionate pets. One species is blind; another has toes like the deer. Some have few teeth, but the striped ant-eater has fifty-four, the greatest number in any living land mammal.

The great diversity of species is reflected by the popular names—tiger, native cat, weasel, mole, rat, mouse, wolf, bear, flying squirrel, opossum, ant-eater, in addition to the terms kangaroo, wallaby, wombat, bandicoot, obtained from the aborigines; but all are marsupials.

The kangaroos and the closely related

HAULING TIMBER TO MILLS: LAMINGTON, BEAUDESERT DISTRICT

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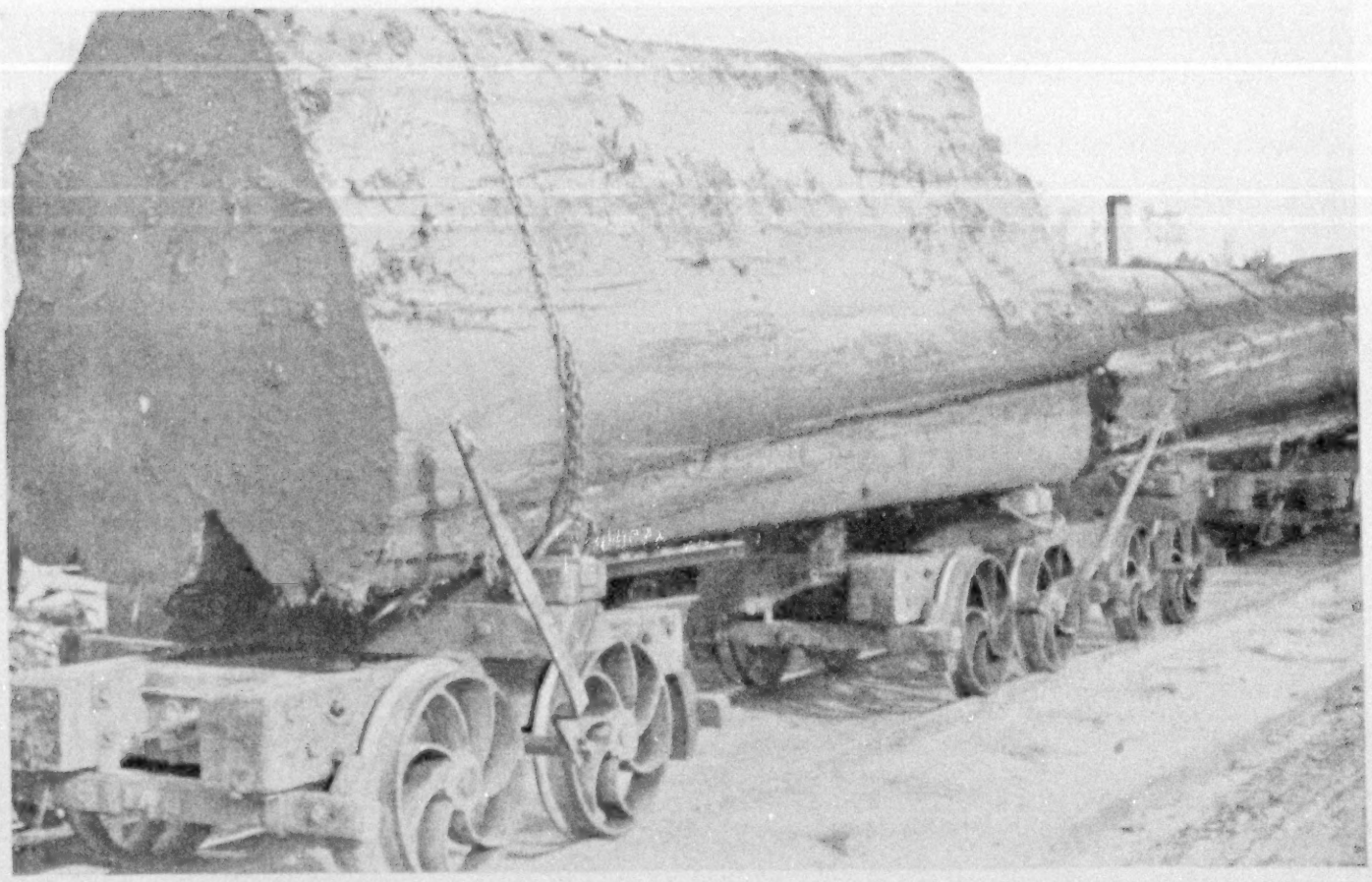
Photograph from Lieut. W. K. Harris

A TIMBER-GETTER AND HIS FAMILY IN THE "BIG SCRUB," NORTH COAST DISTRICT OF NEW SOUTH WALES



Photograph by Beattie

A EUCALYPTUS LOG FROM TASMANIA

A great many of these logs are sawed up into paving blocks and exported to the ends of the earth (see page 495)

wallabies are the commonest of the larger Australian mammals. They play the rôle of the American buffalo, formerly feeding by thousands on the grass-covered plains, but are now disappearing under the attack of the sportsman and fur merchant. In earlier days they formed the chief item of food for the native "blackfellows" and for the pioneers. They are generally harmless and shy, and when approached the females hastily gather their young into their pouches and retreat to shelter by a series of enormous hops at a rate exceeding 15 miles an hour. When attacked at close quarters they defend themselves vigorously.

An "old man" kangaroo standing on his hind legs and tail, with his head as high as that of a man, is no mean antagonist. He boxes skillfully, and with his powerful hind leg and claw can rip up a dog at a single stroke. When streams or lakes are handy he seizes a dog, or even a man, and holds him beneath the water until life is extinct.

The "native bear," or koala, belies his name except in form. He is a lethargic, unintelligent, fluffy little creature, an attractive though unresponsive pet. In the night-time he feeds on the leaves of the gum trees; during the day he usually sleeps curled up in the fork of a branch. The young spend their time in their mother's pouch or hanging to the fur on her back. The wombat plays the part of the woodchuck; the bandicoot is the rat, and the Tasmanian wolf the wild cat, of the marsupial family. The most numerous group of marsupials, like their namesakes, the 'possum of the South, hide away in daytime in hollow logs or trees, or hold themselves on branches with their long, prehensile tails, coming out after dark to feed on leaves or fruit. Their fur is in great demand.

A HUNDRED KINDS OF SNAKES!

Australia is supplied with 100 species of snakes, three-fourths of them venomous. The big pythons and rock-snakes are harmless, but as one travels from the tropics southward the dangerous varieties increase in number, and in Tasmania all are venomous, though only five are really deadly, and fortunately these are rarely seen.

The continent is also abundantly supplied with lizards. Three hundred and

FOREST OF EUCALYPTUS (MANNA GUM): NOTE THE THREE MEN

"To me the most lasting impressions of Australia are of its wonderful woods. One readily understands why the Australian loves his trees. The groves of giant eucalyptus form pictures never forgotten, and the scent of the wattle brings a homesick feeling like the smell of the sage to a Westerner" (see text, page 486).

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Photograph of specimen in U. S. National Museum

AN ANIMAL THAT LAYS EGGS LIKE A TURTLE AND SUCKLES ITS YOUNG: THE PLATYPUS OF AUSTRALIA

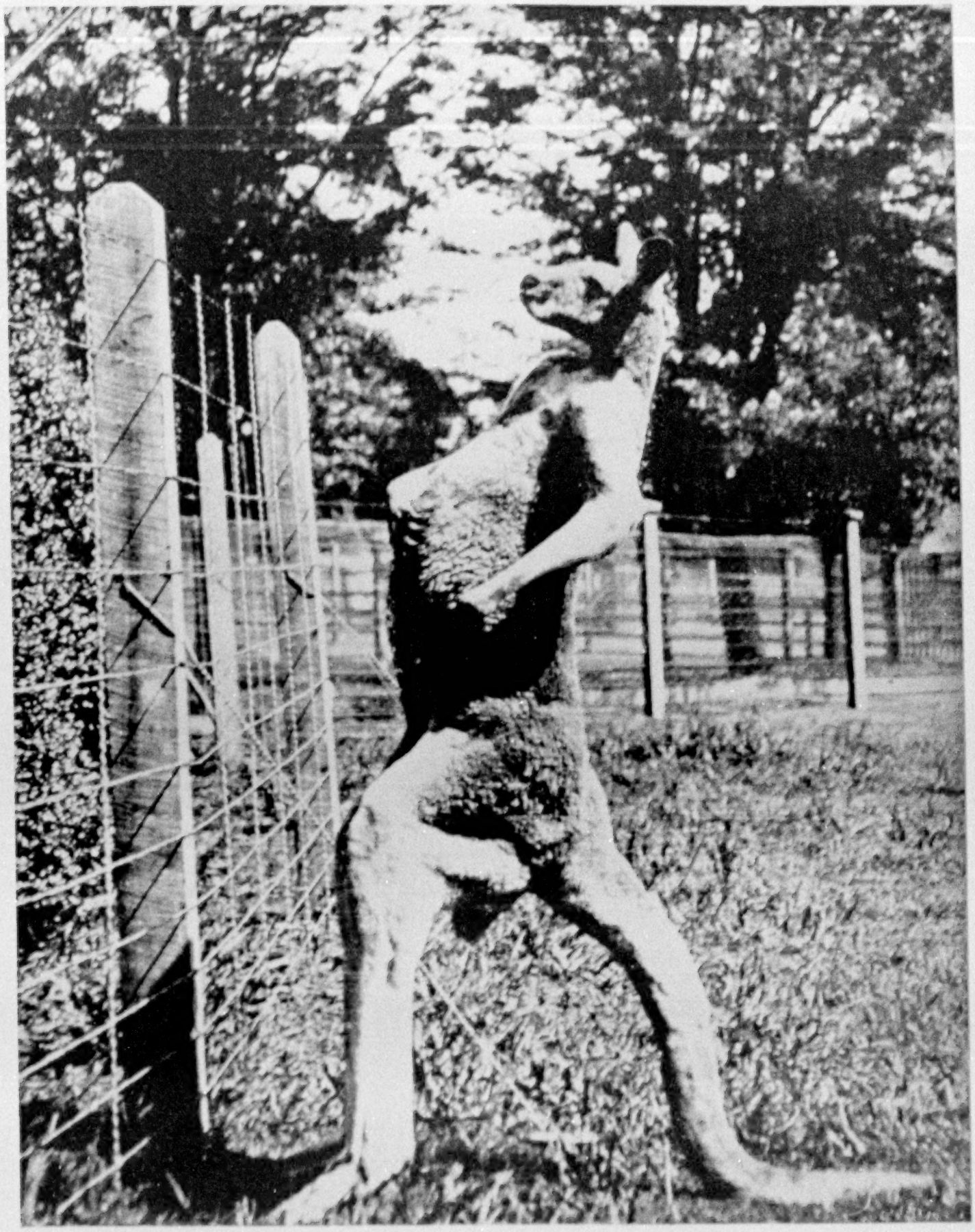
This is a web-footed, beaver-tailed, duck-billed creature which inhabits the river banks of Australia and Tasmania. When it was first described the scientific world thought the naturalist who reported it a nature faker. Even when a stuffed specimen was sent to England there were those who believed it a "fabrication out of the whole skin." It has teeth with which to chew its food, but it lacks an external ear, although its hearing is most acute.

ninety species are recorded, and they may be seen not only in woods and prairies and deserts, in the water, among rocks, and in trees, but also in the less frequented city streets. The monitors, or "iguanas," attain lengths exceeding 6 feet. Their favorite food is young birds and eggs, which they secure by climbing trees corkscrew fashion or robbing poultry yards. Skinks are the most abundant lizards and form an interesting series in which limbs become gradually shorter and toes gradually disappear until "the fore limbs have vanished and the hinder are reduced to rudiments with a solitary toe."

The strangest of all lizards are the legless one, one family of which is found only in Australia. They look and move like snakes, for which they are often mistaken. One of the forms (*Pygopus lepidopus*), locally called the slow-worm, is about 2 feet in length, and so exceedingly brittle that it snaps into several pieces when grasped back of the head. Some of the lizards in the deserts exhibit bizarre forms and are as beautifully colored and as harmless as their namesakes of the Colorado plateaus.

WAS AUSTRALIA EVER CONNECTED WITH SOUTH AMERICA?

The lizards, also most of the flying birds, crayfish, and insects, have their nearest allies in the Malay Islands to the north, and indicate a former land connection through the Pacific islands to Asia. The animals of more ancient lineage, like the marsupials, the air-breathing fish, and the giant earthworms, have their nearest living relatives in South America, and suggest that at some time far back in the history of the world the thousands of



A KANGAROO OF NEW SOUTH WALES

"An 'old man' kangaroo standing on his hind legs and tail, with his head as high as that of a man, is no mean antagonist. He boxes skillfully, and with his powerful hind leg and claw can rip up a dog at a single stroke. When streams or lakes are handy, he seizes a dog, or even a man, and holds him beneath the water until life is extinct" (see text, page 500).

Australia may be said to be a museum in which animals that became extinct in other parts of the world ages ago still persist in a modified form. The kangaroo is a representative of the general type—the marsupial. And of the kangaroos there are many species, from the big grays and reds, the size of a man, to creatures no larger than mice (see page 407).

XUM

Photograph by B. W. Kilburn

THE PET KANGAROO AND HIS TRAINER: AUSTRALIA (SEE PAGE 497)

Many circuses have boxing kangaroos. In nature, the kangaroo, when attacked and a line of retreat is not open, usually backs up against a tree and defends itself with its fore feet. Trainers turn this method of defense to their advantage by putting boxing-gloves on the kangaroo's fore feet, and then training him in the manly art of self-defense; and the boxer who can break through a kangaroo's guard is a good one.

miles of sea now separating that continent from Australia were crossed by a bridge of land.

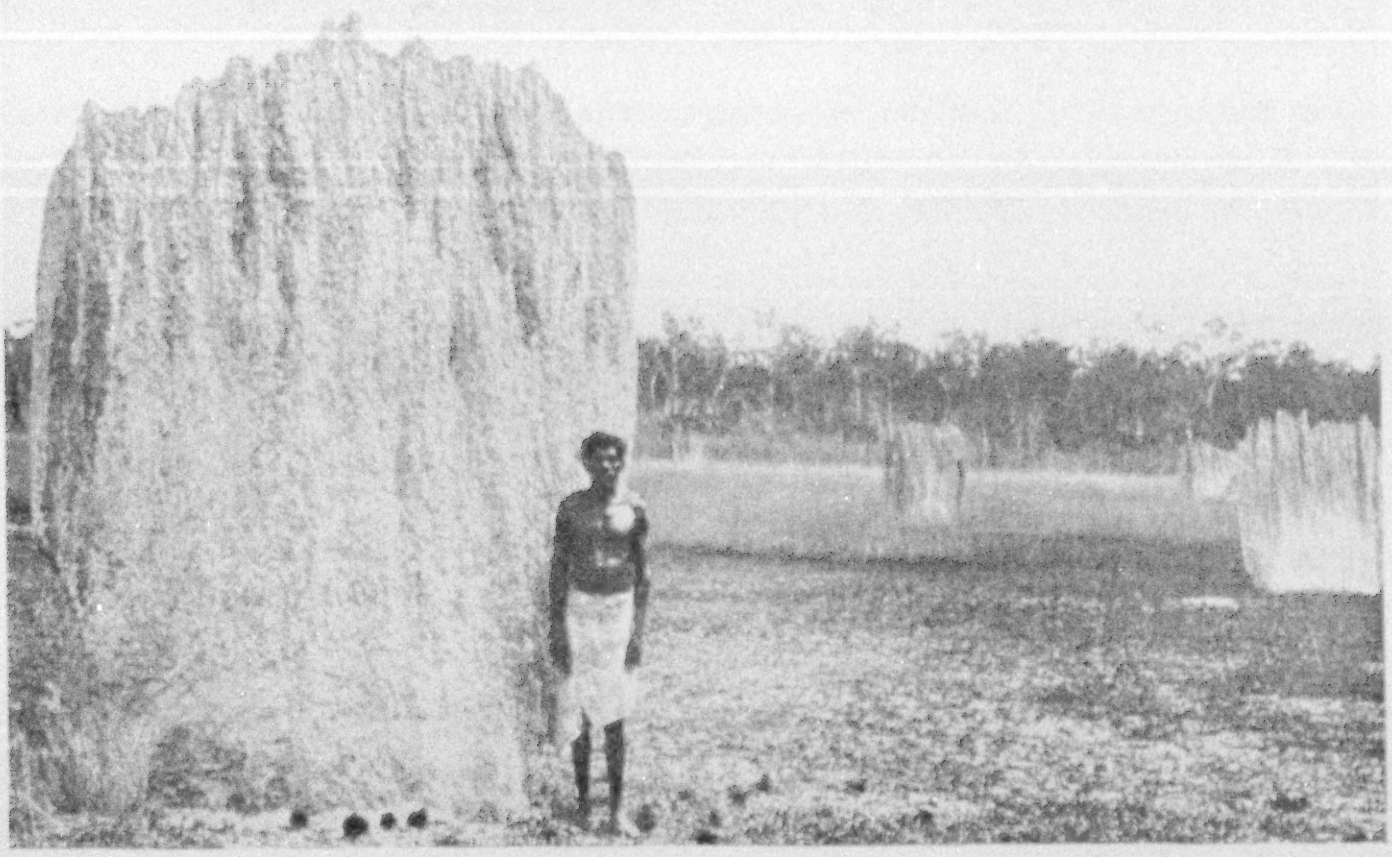
The lover of insects finds Australia an interesting and but partially explored field. Spiders, butterflies, beetles, moths, wasps, bees, cicadæ, are abundant, widely-distributed, and include many forms of great beauty and unusual habit. Some of them are unique. The number of bush flies which occur in summer is incredible. In the arid regions it is impossible to eat with even a semblance of comfort between sunrise and sunset, and traveling without the protection of a head-net is possible only for the skin-hardened bushman.

Of the neuroptera, the best-known and best-hated species is the white ant—a termite of unusual destructive ability. He flourishes in deserts, in woods, and makes his way into city buildings. Supports of houses must be protected by caps of iron, for few timbers are immune from his attack. If printed accounts are to be believed, lead boxes and pipes are not beyond the range of his voracious appetite. The mounds built by the white ants are odd-looking structures, firm as soft wood and of various shapes. Mounds like miniature haystacks scattered through the woodlands or as thickly set as trees in a forest are familiar sights in parts of the continent. Shaft-like nests resembling decayed stumps attain heights of 6 to 10 feet (see page 505).

A LAND OF BEAUTIFUL BIRDS

Australia is stocked with beautiful birds, many of them of unusual aspect. The man who originated the popular saying that "Australian birds have plumage, but no song," must have lived in a sound-proof box. Among the 775 species are included some of the most brilliantly colored, sweetest voiced, and most unusual birds in the world.

Along the northeast coast is the bower



THESE QUEER ROCKS ARE NESTS BUILT BY THE WHITE ANTS (SEE PAGE 504)

bird, which adorns its nest and decorates its playing ground with shells, seeds, and other bright objects, not despising brass buttons and cartridge cases (page 507).

The lyre bird, famous for its plumage, is the rival of the mocking-bird of the South in sweetness of tone and skill as a mimic. The crow-shrikes ("magpies"), the brown flycatcher ("Jacky Winter"), the bush warbler, the rock warbler, the reed warbler, the bush lark, the cuckoos, the honey eaters, and the "Willy-Wagtail" constitute parts of a bird chorus difficult to surpass. Cockatoos are as common in Australia as crows in the Central West; even in the desert flocks were frequently seen. Some of them are excellent talkers, most of them gorgeously dressed.

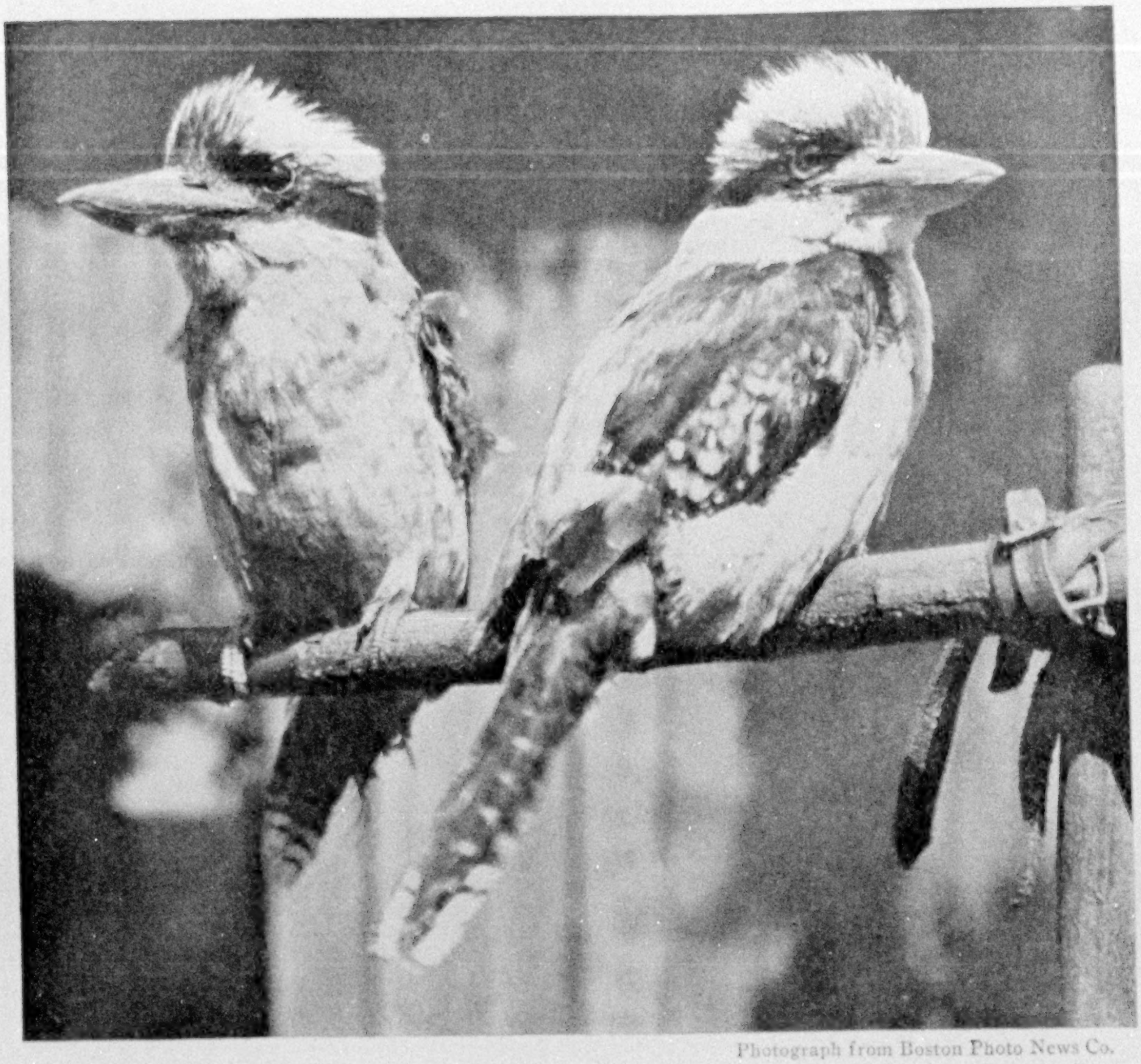
A most surprising bird is the kookooburra, or laughing jackass. All at once in the quiet bush come loud peals of uproarious, mocking laughter. One is not inclined to join in the merriment—it all seems as foolish and weird as if an idiot boy were disturbing a congregation in church. When the source of the laughter is located, it turns out to be a silly-looking bird with clumsy, square body and open mouth sitting unconcernedly on a stump. Some animals look so foolish, say and do such silly things, and yet are so patient and friendly that affection involuntarily goes out to them. The kookooburra is one of these and the bird which mocked me at Mt. Gambier, and the solemn little fellow which toddled about the yard of my hostess at Melbourne will long remain in memory (see page 506).

A BIRD-BUILT INCUBATOR

The ibis occur by thousands, and the gigantic black-necked stork, or jabiru, standing 5 feet high, inhabits the swamps of the northern coast, while the graceful black swan frequents the estuaries and lakes. The mallee hen and the brush turkey build mounds of sticks, leaves, and earth 3 to 10 feet high. The eggs are laid in burrows excavated in the mound and are left to be hatched by the heat resulting from decomposing vegetable matter—a home-made community incubator.

The cassowary of the forests of Queensland and Papua and the emu, which is found throughout the continent, are unknown outside the Australian region. The emu is the national bird and shares with the kangaroo the task of upholding the shield on the commonwealth coat of arms. It is a powerful bird, can

XUM



Photograph from Boston Photo News Co.

THE LAUGHING JACKASS (SEE PAGE 505)

run at the rate of 15 to 20 miles an hour, and break an ordinary fence by impact.

The ostrich has been introduced into South Australia and the export of its plumes bids fair to assume considerable proportions. Stray ostriches are occasionally met with. On a smooth stretch of desert road north of Port Augusta we had an opportunity to gauge their speed. It was a neck and neck race for 2 miles, with the motor cyclometer registering 30 miles an hour.

THE ORIGINAL AUSTRALIANS

The isolation of the Australian Continent, so clearly reflected in its fauna and flora, has left its stamp on the native race. Like the kangaroo and the tree fern, the aboriginal is a remnant of bygone days. Paleolithic man, whose primitive tools are eagerly sought in the caves and gravels of Europe, was alive in Tasmania within the memory of people now living, and Neolithic man is roaming the deserts of Australia by hundreds.

Though comparatively little is known of the aborigines and many tribes have never been studied, there is general agreement that the "blackfellow" is on the lowest rung and perhaps at the very bottom of the ladder of civilization. In the opinion of Andrew Lang, "they are infinitely beneath the status in culture of Paleolithic man of the mammoth and reindeer period," and their "manners and rites were far the most archaic of all with which we are acquainted."

The Australian native* is unlike the

*The term "native" is used in the American sense. In Australia the term is applied to native-born whites. The original inhabitants are "blackfellows" or aborigines.

From "Birds of Australia," by John Gould

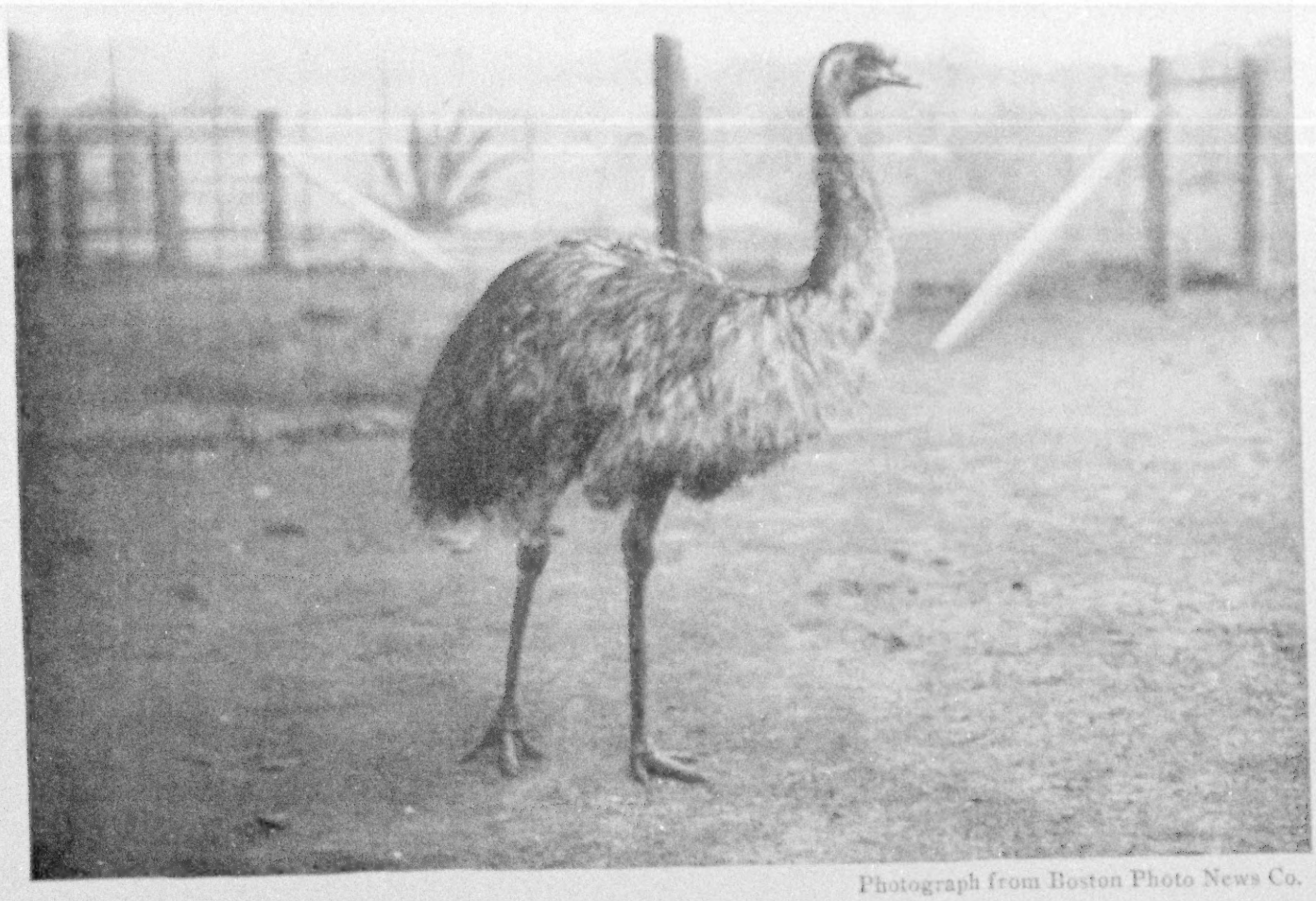
A BIRD THAT BUILDS A PLAYHOUSE AND GARDEN—THE AUSTRALIAN BOWER BIRD

There are several species of bower birds, chief among them the Satin and the Newton. The Satin bower bird is the best known. When the bowers were first discovered it was supposed that they were playhouses built by the native children; but, as a matter of fact, they are the dance halls of bird land. The nests are built in the trees and have no connection with the playhouses. The male birds build these latter and gather every bright and shining object they can find to adorn the entrance to the bower. When it is completed, according to one who has watched them, little "at homes" are given daily, at which the males meet and pay their court to their lady loves, now bowing and scraping, now playing hide and seek through the bower, and now doing an absurdly dignified dance for their edification. Newton's bower bird decorates its bower with fresh flowers every day, and if a visiting male bird wants a fight all he has to do is to disturb one of these flowers. The master of the bower proceeds with the painful duty of teaching him how to behave in company, while the remainder of the party raise a great racket, but never interfere. A naturalist studying them disarranged one of their flowers, but each time he did it the bower master rearranged it with great care.

negro, the Malay, the Mongolian, and the American Indian in physique and facial expression. His range in height is about that of Europeans. Some individuals are strongly built, but in general only the upper part of the body is well developed. The legs are usually thin and long, with inconspicuous calves, the great toe is "loose," and the foot is about as useful as the small, delicately formed hands in picking up objects. A long skull, with a low, flat forehead and brows overhanging deep-set, intelligent eyes, a heavy lower jaw, strong teeth, and a nose broad and very flat, with wide nostrils, are conspicuous features. His cranial capacity is 75, as compared with 83 for the African negro. Wavy or curly hair, not woolly or frizzy, of auburn or black tones, is abundant not only on the head and face, but in some cases covers the body, and many new-born children are coated with long downy hair.

LITTLE USE FOR CLOTHING

With the arts the native is little acquainted. He has no permanent buildings. His shelter is a cave or overhanging rock, sometimes a piece of bark toward off rain or branches to shield him-



Photograph from Boston Photo News Co.

THE NATIONAL BIRD—THE EMU

The emu is a bird that has relied on its legs for so long and used its wings so little that it now cannot fly if it wants to, its wings having degenerated into mere rudimentary members. It fights only in self-defense, but it can kick sidewise as well as backward, sometimes with force enough to break a man's leg. Papa Emu is an amiable person, taking most of the cares of the household off the shoulders of his mate. The ostrich has plumes and only two toes, while the emu's feathers almost resemble hair, and it has three toes (see page 505).

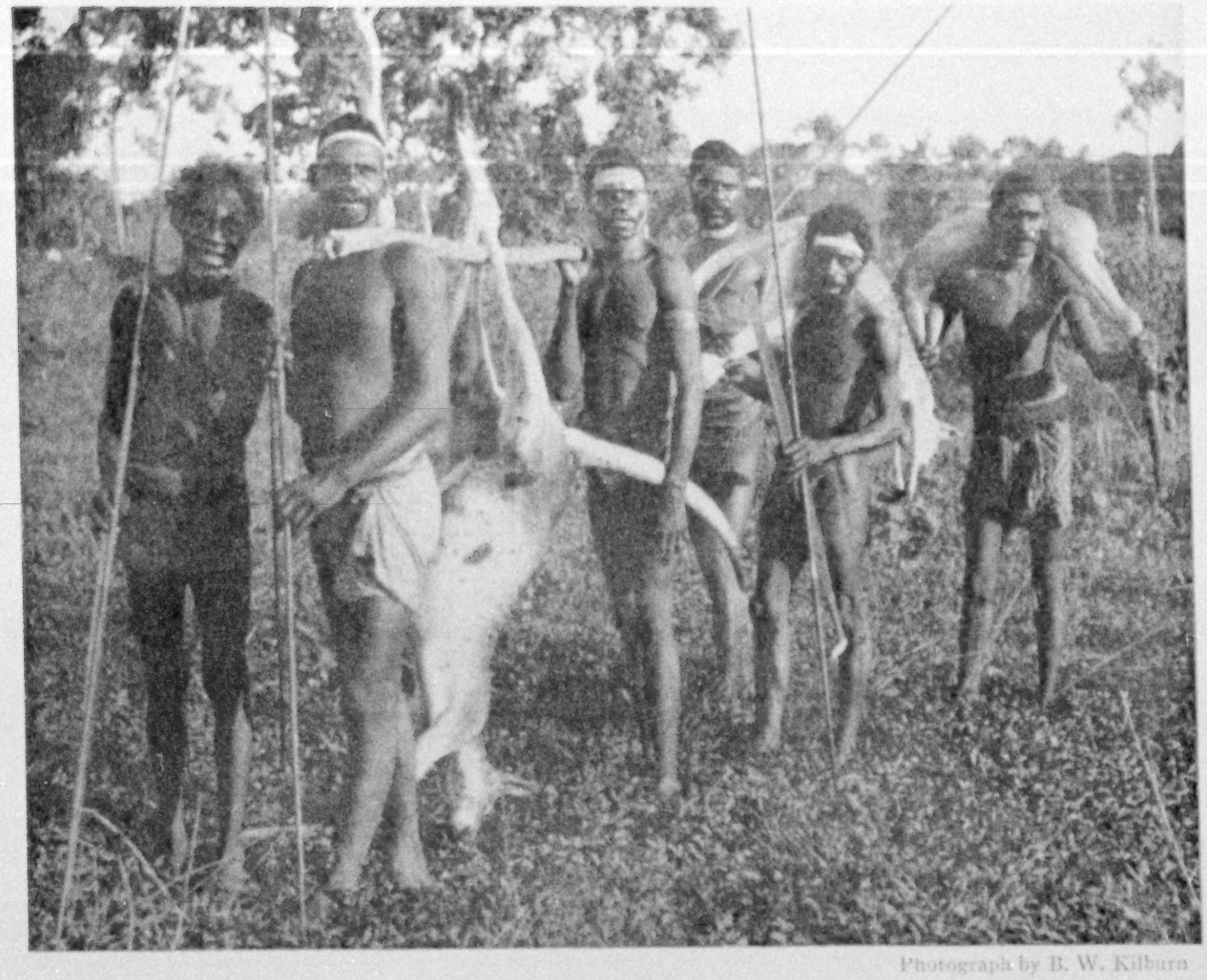
self from the sun. He does not bother with clothes except when the weather is particularly bad, and then bark or the skin of the kangaroo is used without sewing or fashioning. Some tribes use rushes and seaweed for temporary clothing or make a blanket from the dried scum of lakes. For boats pieces of bark tied at the end and daubed with clay suffice.

He makes no pottery, and cooking utensils are represented by stones for crushing roots and seeds, stone knives, and a rudely fashioned scoop which serves as a dish, a spade, and as a receptacle for carrying water. He knows nothing of agriculture, and his one domesticated animal is the dingo, a half-wild dog.

The geography of Australia is such that localities where food and water are sufficient for a large number of people are very scarce. There are no wild cereals, and the native fruits are few in number, restricted in distribution and of meager nutriment, while water must be searched for over half the continent. The different tribes therefore have no fixed abode beyond vaguely defined limits inside of which they roam in search of food like packs of hunting animals. The groups are necessarily small and their relations are governed by fear and suspicion. Infrequent contact has resulted in the development of many languages within the same race. In "one district less than 300 miles square seven languages are spoken, one of them in two dialects, one in five."

MOST EXPERT OF HUNTERS

In endurance and speed he is not the equal of the American Indian, and his weapons of wood and poorly fashioned stones are effective only at short range; but as a hunter the native Australian is marvelously adjusted to his environment.



Photograph by B. W. Kilburn

THE HAPPY NATIVE KANGAROO HUNTERS: QUEENSLAND

His success lies in an intimate knowledge of the habits of animals on land, in the ground, in trees, and under water, and his wonderfully developed powers of observation.

He decoys pelicans by imitating their cries, catches ducks by diving below them, locates an opossum in a tree by marks on the bark or by the flight of mosquitoes, finds snakes by observing the action of birds, and follows a bee to its store of honey. Any animal which leaves a track, however dim, in sand, on rock, or in the grass, falls an easy prey to the blackfellow. Children are taught to track lizards and snakes over bare rocks and to find their absent mother by following tracks too indistinct to serve as a guide for an European. When a white man is lost in the desert or a child strays from home, the final resort is to secure a "black tracker."

When in search of game or enemies, the native is armed with a stone hatchet, a boomerang, and a stout club, all stuck in a belt made of cords spun from hair or fur, and with a sheaf of selected spears and a throwing stick carried in the hand. The spear is the principal weapon—long ones armed with stone or barbed wood for war and shorter ones of reeds tipped with hard wood, or still shorter-pointed sticks for hunting. The effective range of the spear is greatly increased by the use of a wommera or spear-thrower.

THE INVENTOR OF THE BOOMERANG

Clubs of all sorts are hurled at prey or human enemies. The best-known form is the boomerang, made of a curved piece of heavy wood about 2 feet long and 2 inches wide. The well-known return boomerang, round on one side, flat on the other, and slightly twisted on its axis, is used as a plaything or to hurl at flocks of birds in the sky. The war and hunting boomerangs are heavier; they do not return to the thrower, but are deadly weapons at ranges inside of about 400 feet.

Faced with starvation, the native knows

Photograph by C. P. Scott

Photograph from H. E. Gregory

SOUTH AUSTRALIAN BLACKFELLOWS: THESE SAVAGES RANK LOWEST IN INTELLIGENCE OF ALL HUMAN BEINGS

nothing of property rights; food is to be obtained wherever found, either in the open or in possession of his fellows or of the immigrants. When his hunger is satisfied the next strongest man may have the remains.

The kangaroo, wallaby, and opossum form his chief food supplies; but no animal or nourishing plant is neglected. The diet of the north Queensland aborigines includes 240 plants and 93 species of mollusks. Ants, caterpillars, moths, beetles, and grubs of all sorts are eaten raw or cooked. Honey, birds' eggs, and young birds are obtained from trees by use of a climbing rope or by cutting notches with his stone hatchet. The native is fond of snakes and lizards, which are cooked on hot stones covered with leaves and earth.

Human flesh is not a regular article of diet, but when conditions are hard men who have fallen in battle or died of disease are added to the food supply, and infants are killed and sometimes eaten by their parents. Captives are commonly slaughtered and eaten, sometimes for ceremonial purposes, sometimes to satisfy hunger. The flesh of the native or Chinese or Malay, whose diet is vegetable, is said to be preferred to that of Europeans, which is tougher and more salt.

The blackfellow is not a "degraded savage," but rather a primitive man placed in an unfavorable environment. When food and water are abundant the aboriginal is kind to the infirm, and even shows traits of generosity and gratitude. When the struggle for existence is severe he becomes an animal searching for its prey. Mentally he is a weak child, with uncontrolled feelings, without initiative or sense of responsibility. In many respects he is intelligent and profits by education, but abstract ideas are apparently beyond his reach. His ignorance, suspicion, and fear, rather than viciousness and evil intentions, make him dangerous to strangers.

The story of the relations between aborigines and whites of Australia repeats a chapter in American history. Organized brutal treatment in Victoria practically ended with the Myall Creek massacre, in 1839, during which thirty or forty men, women, and children were murdered by the whites. The Queensland natives suffered unbelievable cruelties at the hands of the white settlers as late as 1860-1870, and not until 1897 did West Australia undertake their protection. In Tasmania a great hunting bee, in which 3,000 Europeans of all classes took part, was organized in 1830 to exterminate the native race. From the slaughter about 200 were rescued and placed within a reservation; by 1847 only 44 natives remained. In 1876 Truganini died and the Tasmanian race became extinct.

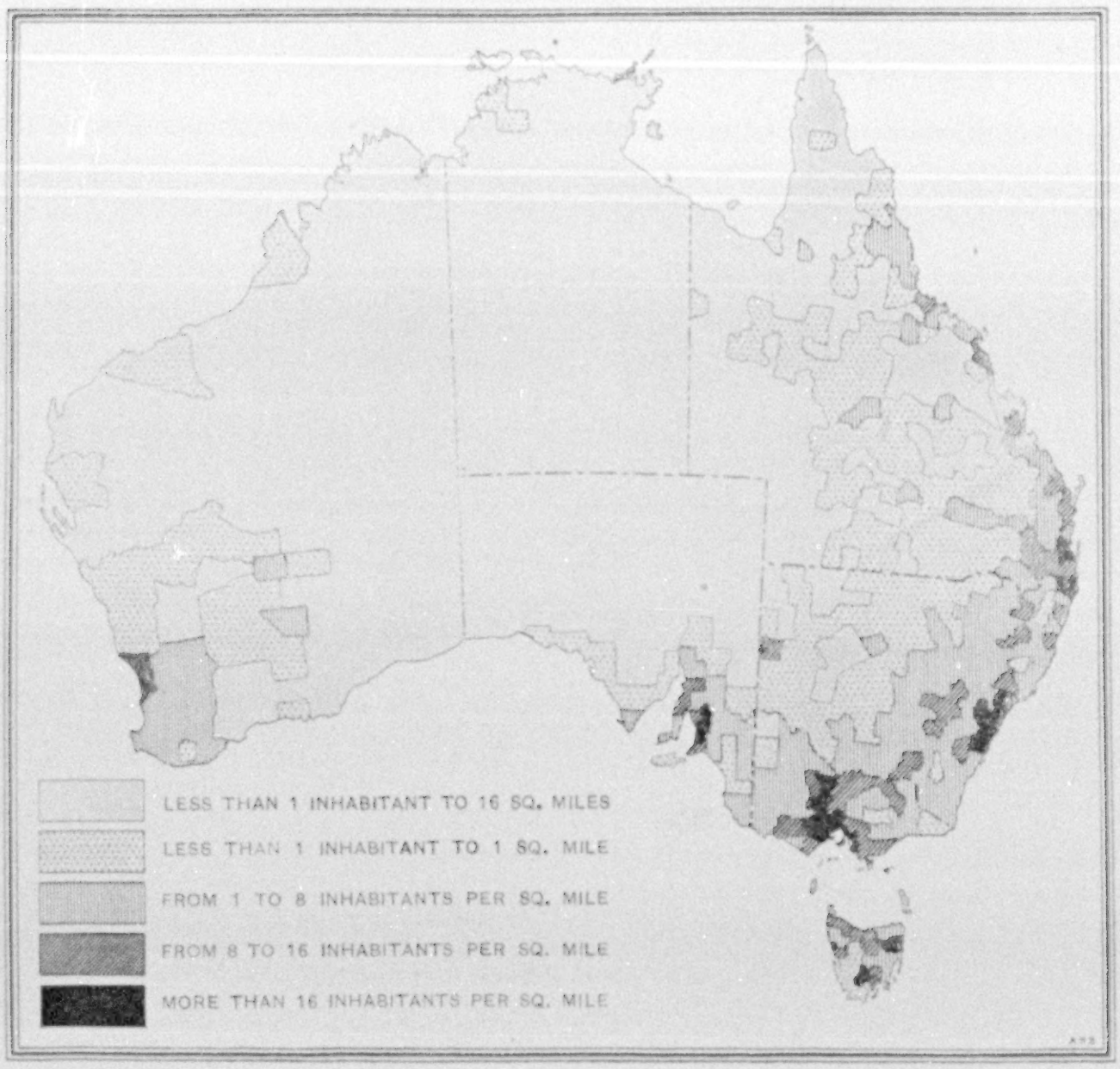
The natives on the mainland are now under the protection of the government, but "the birth rate has dropped amazingly" and it is doubtful if any large number can survive the process of civilization.

OUR PRIMITIVE ANCESTORS

The origin and migration of the Australian native stock is a fascinating story, whose outlines and chapter headings only have been written. The Tasmanians were perhaps a separate group related to the Papuans. Unlike the native of the mainland, their hair was coarse, short, woolly; they had no boomerang, no wommera, knew nothing of polished stone implements, and their boats were rafts made of reeds.

It is probable that this race reached Tasmania before the Glacial Period, when its island home formed part of the continent. The great antiquity of the race on the mainland is demonstrated directly by the discovery of stone hatchets buried in peat beneath extensive deposits of marine clays 15 feet below sea-level, and no less conclusively by the great development of languages and dialects and the absence among the tribes of traditions of migration.

A feature of peculiar interest is the almost universally accepted conclusion that the aboriginal stock of Australia belongs to the Indo-Aryan or Caucasian race. Their nearest relatives are the Veddahs of Ceylon and the Dravidian races of the Deccan plateau. Although perhaps the most primitive of the world's inhabitants, tucked away on an extremity of the world's lands and isolated for a whole geological period, they are our own



A MAP TO SHOW THE DISTRIBUTION OF THE POPULATION

racial relatives and picture the life of our ancestors.

MOST OF THE PEOPLE LIVE ON THE SEACOAST

Australia is the size of the United States; its density of population is less than that of Arizona (1.67 persons to the square mile). The continent is less thickly populated than Russia in Asia, or the similarly situated Canadian plains, and has less people to a square mile than South Africa, Algeria, or even Arabia. All of the States are thinly settled.

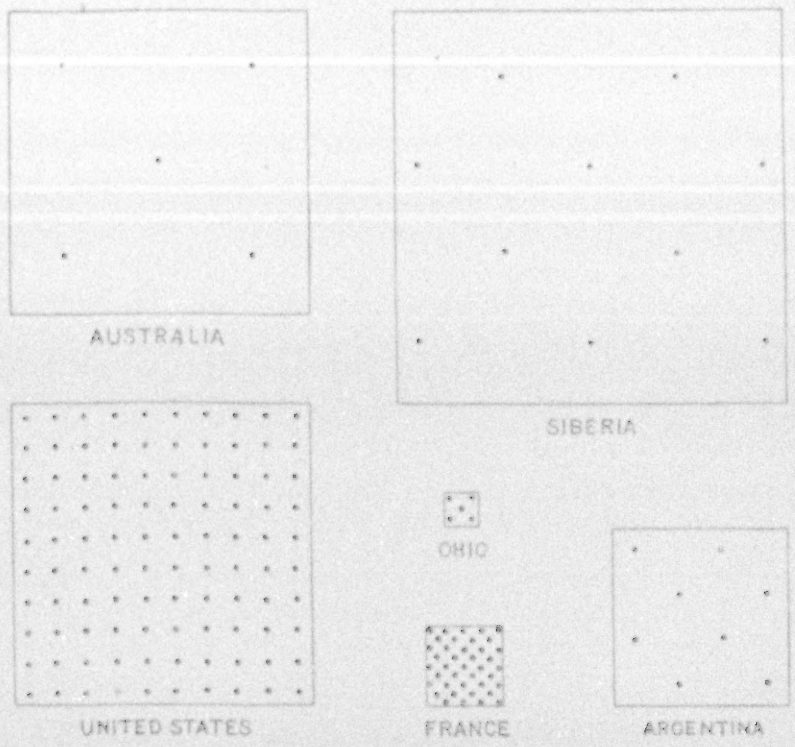
Victoria, the most densely populated State, is about equal in size to Kansas plus Connecticut and Rhode Island; its population is about that of Connecticut. New South Wales, much larger in area than Texas, has the population of Arkansas. Queensland, inside of which could be placed the seventeen Atlantic States, extending from the Gulf of Mexico to Quebec, in addition to Minnesota, North Dakota, South Dakota, and half of Iowa, enrolls less people than Oregon. South Australia, larger than the three Pacific States, California, Oregon, and Washington, plus Kentucky and West Virginia, has the population of New Hampshire.

The enormous State of West Australia, within whose borders Spain, Italy, France, Belgium, Germany, and Austria-Hungary, or all the United States east of the Mississippi, could be accommodated, has 40,000 fewer people than rural Vermont. In density it corresponds with Greenland and French Sahara. Tasmania, the baby State, is a little larger than West Virginia; its population is about that of Columbus, Ohio. The Northern Territory, ten times the size of Alabama, is inhabited by 3,672 people—the sparsest population of any consider-

able area of the earth's surface inhabited by man.

A modern warship, if allowed access to the bays and harbors, could bring about one-half the population within reach of its guns. A belt of country 100 miles wide along the east, south, and southwest edges of the continent would include probably 80 per cent of the Commonwealth population. There are no inland cities of over 10,000 population, except six mining camps, and the most remote of these is about as far from the sea as is Pittsburgh.

In the center of the continent is an area larger than all the United States west of the longitude of Denver, in which less than 5,000 people reside.



A COMPARISON OF THE DENSITY OF POPULATION OF AUSTRALIA, THE UNITED STATES, SIBERIA, FRANCE, AND ARGENTINA

The squares represent the relative areas of several countries and the dots the population, there being a dot for each 1,000,000 inhabitants. If small squares are formed by connecting the dots, the relative sizes of these will represent the relative amount of land per inhabitant.

CITY LIFE EVEN MORE POPULAR THAN IN THE UNITED STATES

A striking feature of the Australian census is the concentration of population in cities—a phenomenal situation for an agricultural and pastoral nation with less than 1 per cent of its area under cultivation and 47 per cent unoccupied. The six Australian State capitals include 38.80 per cent of the Commonwealth's population, and five of them are growing at the expense of the back country. No other nation, and few States, can match these figures. In South Australia 45.68 per cent of the people live in Adelaide; Perth enrolls 37.95 per cent of the people of West Australia; a large part of the remainder are in mining camps. Sydney, the capital of New South Wales, has 725,000 inhabitants, 39.6 per cent of the entire population of the State, and 71 per cent of the increase for the period 1911-1913 is credited to the metropolis.

Victoria shows an even more marked tendency toward urban concentration. The proportion of the population of Melbourne to the total population of the State has steadily increased from 43.3 per cent in 1909 to 47.1 per cent in 1914, and there seems no prospect of a diminution. During the three-year period ending 1913, 84 per cent of the increased population was credited to Great Melbourne, which is growing three times as fast as the remainder of the State. During 1914 a net loss was recorded for the population outside of the metropolis.

It has interested me to compare the distribution of the first 5,000,000 people within the United States—a number reached about 190 years after the first English settlement—with the distribution of Australia's first 5,000,000, attained in 1915—127 years after the landing at Botany Bay. In both cases the people were grouped on the edge of the continent, in corresponding positions, their centers of settlement determined by climate and soil and nature of the coast. The chief point of difference is the absence of large cities in the United States. In 1800 New York was one-ninth the size of Sydney, and the entire urban population of the United States (4 per cent of the total population) could be accommodated in the city of Adelaide.

WHITE AUSTRALIA

A "white Australia" is the settled policy of the Commonwealth government,

Photograph by B. W. Kilburn

A SCHOOL IN THE BUSH: QUEENSLAND

the immigration laws being so administered as effectually to exclude colored races. Legislation is directed particularly to the exclusion of Chinese, Japanese, and Polynesian labor, not only from the land, but from employment in pearl fishing, coastwise shipping, and on overseas steamers holding mail contracts. The various restrictive acts have secured the desired result. At the latest census (1911) there were 38,680 Asiatics, 693 Africans, 84 Americans, 2,751 Polynesians, 10,113 mixed-blood Australian aboriginals — a total of 52,338, including 14,554 half-cast, out of a population of 4,568,707, or a little more than one per cent.

The Australian's ideal is a continent of whites without the "taint of color," "a homogeneous people of British origin." They point to America as a horrible example of an unmanageable mixture of races. They recognize the fact that their policy will indefinitely delay the development of the continent, but are willing to make the sacrifice.

But the fundamental reason of their policy is doubtless economic, an unwillingness to come into competition with "people with lower standards of living," to run the risk of disturbing the existing domination of the "laboring man." This attitude is shown by legislation against Asiatics already domiciled in Australia. By legal definition one Asiatic constitutes

Photograph by B. W. Kilburn

"A TOUCH OF NATURE MAKES THE WHOLE WORLD AKIN"

Children the world over are never so happy and interested as when they feel they are actually helping in some useful work. Australian youngsters are given every opportunity to help and they develop early a love of the practical things of life, which viewpoint generates energy, resourcefulness, and a love of the out of doors.

a factory, but four white people in three States and six in West Australia are allowed to work together without coming under the restrictions of the factory acts.

Australia is not only "white," it is also British—the most British of all lands outside of Great Britain. Australian writers call attention with pride to the fact that Canada has her French province, that the Dutch are in South Africa, that India and Egypt have large native elements, and that America is a medley of races. Of the total population at the last census 82.90 per cent were Australian born; 13.35 per cent were natives of the United Kingdom, and 0.72 per cent were born in New Zealand.

SOME NATIONAL TRAITS

They are proud of their British ancestry and glory in the achievements of their race.

An American who knows the United States and Canada feels at home in Australia, much more so than in the British Islands. He finds the people discussing immigration, land settlement, railroad building, mining, irrigation, forestry, secondary education, social legislation, progressive *vs.* stand-pat policies, military

Photograph from Janet M. Cummings

THE ROYAL ROAD TO KNOWLEDGE: YOUNG AUSTRALIANS OFF TO SCHOOL, VICTORIA, AUSTRALIA

Old Father Time steps aside for the moment to make way for Youth as he marches bravely along the one Highway to Knowledge that is available to Prince of the Blood and peasant lad alike—the school-room

© Underwood & Underwood

"DOING THEIR BIT"

Both well over their allotted threescore and ten, these two Australian women—the one on the right the mother of the commander-in-chief of Australia's oversea forces—are nevertheless contributing their share of assistance in maintaining their country's contingent at the front. They spend most of their waking hours cutting up clean rags to be used in pads for the wounded.

training, need of a big navy, and other matters relating to national development. He hears in general the language of Ontario, but the variation in individuals, families, and communities is closely similar to that in the United States, plus a bit of cockney.

Many of the numerous Australianisms are also Americanisms, but would require an interpreter in England. In some mining towns and outlying villages the local dialects of the United Kingdom are said to prevail, but there is probably nothing in Australia like Dunedin or Christchurch, New Zealand, where the peculiarities of speech of southern Scotland and middle England are found in an exaggerated form.

It seems to me that two things mark the Australian as a class from Americans—their attitude toward work and their attitude toward wealth. The percentage of men who do no productive labor, loafers and "idle rich," is probably about the same in the two countries, but the number of men and women who voluntarily work long hours and gladly assume uncongenial tasks with the idea of demonstrating their usefulness and "getting ahead" is very much greater in America. In Australia the species finds an uncongenial environment.

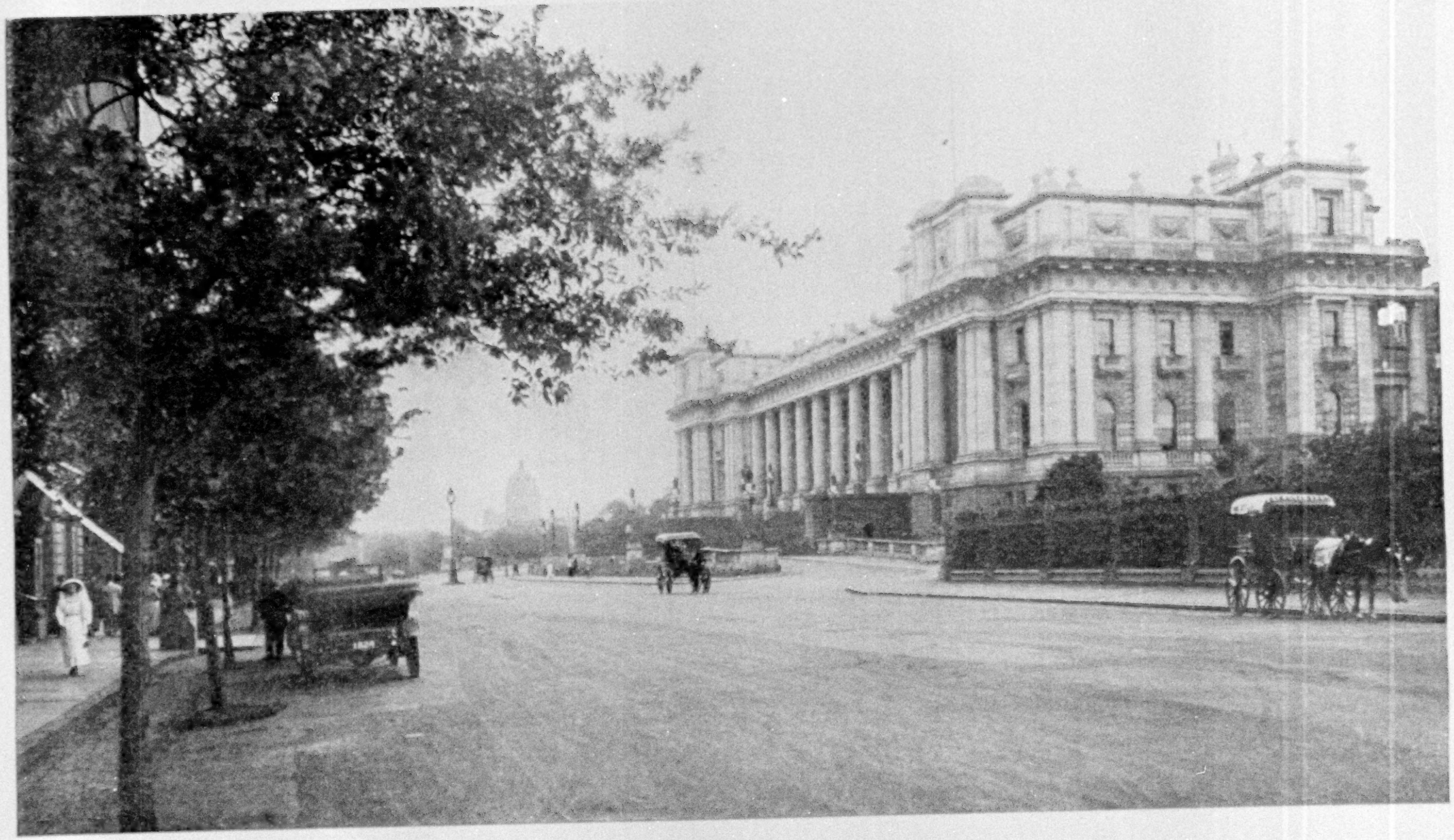
On the basis of doing a moderate amount of work amidst agreeable surroundings, most Australians are workers. Short hours are the rule, and there is a tendency to ward off competition by legislative enactments rather than to meet and overcome it.

The desire for money is in most cases a desire to secure a competence, not to secure power and prestige by amassing a huge bank account. Wealth is so diffused that nobody is really poor and few are

XUM

HOBART AND MOUNT WELLINGTON: TASMANIA

With Mount Wellington as a striking background and the Derwent River as its foreground, Hobart, the capital of Tasmania, is one of the most picturesquely situated cities of the southern world. Founded in 1804, it now has a population of 40,000 and is a highly progressive municipality.



COMMONWEALTH PARLIAMENT HOUSE: MELBOURNE, VICTORIA

While Sydney is much older than Melbourne, there is a neck-and-neck race between them for the honor of the greatest population, not to mention a gentlemanly rivalry in all other matters. More than one-fourth of the population of this continent is centered in these two cities. Combined they have about 1,400,000 people, while the population of the six Australian States is only about 5,000,000. At present Melbourne is the seat of the Federal Government, but will lose that distinction when the new capital, Canberra, is completed.

Photograph by Norman Thomas

SPRING STREET, IN MELBOURNE

Melbourne is the Chicago of Australia. Founded fourscore years ago, it now has nearly 700,000 population, and proudly claims to have finer public buildings than any other city of its size in any part of the world. The ramshackle districts which usually lie between the suburban places and the "down-town" section of a city are not found in Melbourne, which is practically slumless.

very rich. It is stated that one in six Australians owns property, and that one in four has deposits in savings banks.

HIGH SCHOOLS AND UNIVERSITIES POORLY ATTENDED

One of the anomalies of Australian life is their attitude toward education. In a country where the government digs a man's well, sells him fish, and tells him when to open his store, and where 98 per cent of the adult population can read and write, it is strange indeed that interest in higher education should be so slow in developing.

Free public education from kindergarten to a university degree, giving equal opportunities to rich and poor of both sexes, is not known in Australia. The numbers enrolled in secondary schools, both public and private, and in universities are therefore relatively small.

The States of Washington and Victoria have about the same population, but the Washington high schools enroll four times the number of pupils and the State University enrolls four times as many students.

One reason for the small number of students in the university and secondary schools is doubtless the tuition charges; but this obstruction is partly removed by scholarships and stipends of various sorts granted to deserving pupils at public expense.

To my mind the chief reason is the low valuation placed on higher education; too few are willing to obtain it at a personal sacrifice. Stories of American boys and girls without money, who by the thousands work their way through school and college by sacrificing their holidays and vacations, performing menial services and living on meager fare in cheap lodgings, read like fiction to the son of the Australian laborer.

AUSTRALIANS AT PLAY

With a short, easy day for the business and professional man and for the wage-earner, with Saturday afternoon free and frequent holidays, the Australian has the energy and the time for amusements, which, because of the climate, take largely the form of out-of-door sports. Horse-racing is a national interest, to an extent unknown in other countries, and race-courses are as much a part of a community's equipment as streets and cemeteries.

Metropolitan "cup days" in spring are the Easters of Australia, the days on which fashionable women display their new gowns and hats. For the great races people come to the cities by thousands, the streets are crowded, and the hotels packed to the limit. Ordinary work practically ceases; freedom and gaiety prevail and money is lavishly spent. The attitude of the community is like that of an American student during an intercollegiate foot-ball match.

Unfortunately horse-racing is not only the national sport; it is also the national vice. Where thousands see the races, tens of thousands bet on them. A lack of knowledge of horse or rider or owner is no deterrent, for there is little pretense of an honest race. The grand prize of $25,000 to $100,000—occasionally $300,000—is irresistible. The gambling spirit pervades all classes and all occupations.

To quote an attorney general of New South Wales: "Clerks and shop girls will stint themselves of food and office boys pilfer the stamps to buy a ticket or share in one of these lotteries . . . nine-tenths of the embezzlements and forgeries and breaches of trust which come before the Australian courts are directly due to horse-racing and its concomitants." In spite of editorial and pulpit utterances, of votes in the hands of women, of efforts of the Commonwealth government and mild legislation by States, the evil continues.

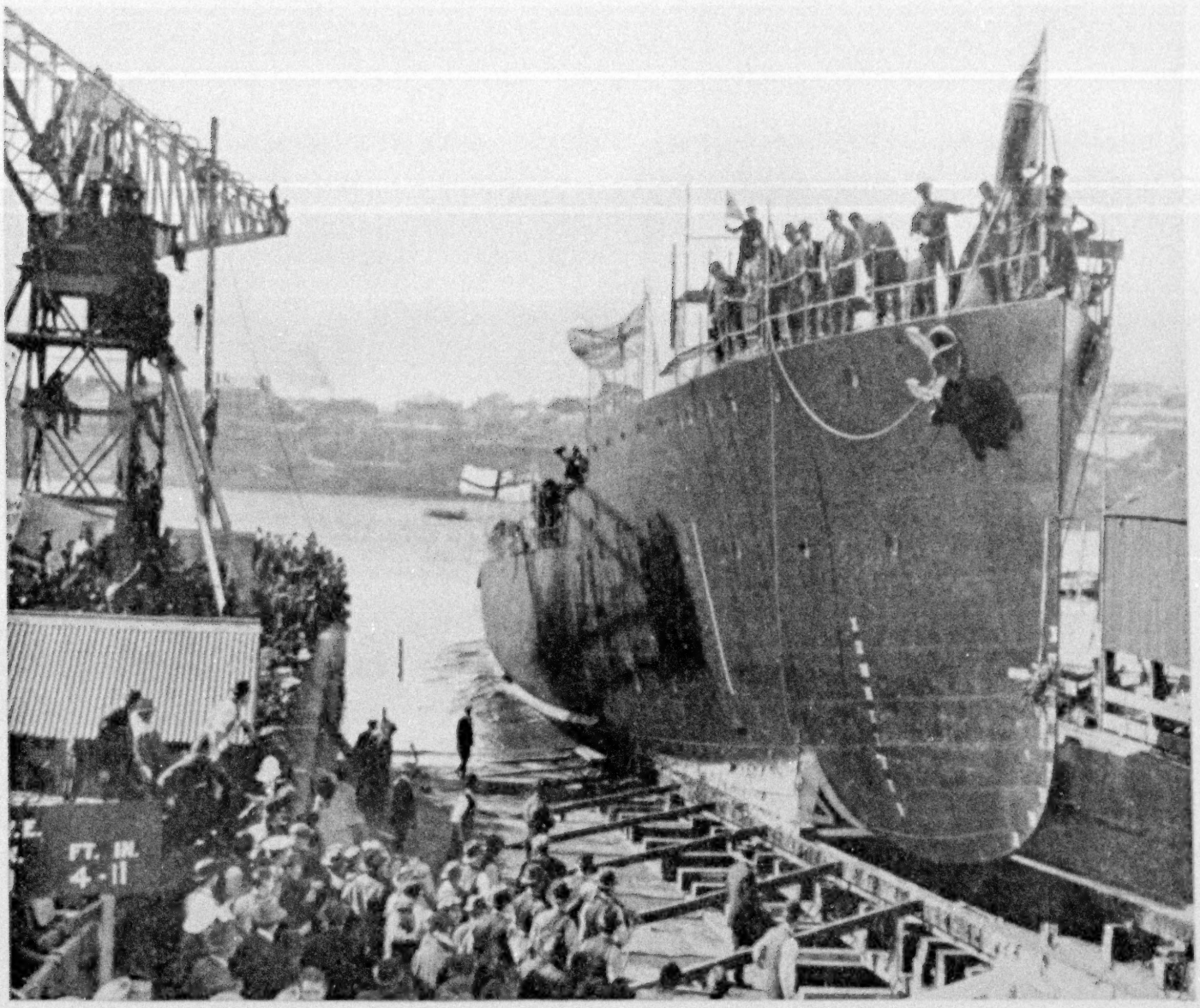
As in the United States, the "movies" often constitute the chief indoor amusement, but the universal recreation is the picnic, which in Australia reaches its highest development. Men, women, children, families, clubs, churches, lodges, and miscellaneous groups are out on picnics afternoons, Sundays and holidays.

Two picnics a week are not unusual; a young lady of my acquaintance had five to her credit. The picnickers walk, ride horses, take wagons, or go by motor, street car, train, or boat. They go to the shore, to the woods, to rivers, to pictur-

Photograph by Norman Thomas

INTERIOR OF SYDNEY CITY HALL, WHICH HAS ONE OF THE LARGEST ORGANS IN THE WORLD

An Australian's idea of a nice day is the exact antithesis of ours. He thinks it is a nice day when it rains. When the havoc wrought by a drouth is realized, one cannot but agree that his point is well taken and his opinion justified. One wonders, though, if when the great city audience pictured above went into the street and found it raining "cats and dogs" a consensus of opinion among the ladies would have borne out the previous statement.



Photograph by George Bell

LAUNCHING THE AUSTRALIAN-BUILT TORPEDO-BOAT DESTROYER "TORRENS"

The policy of the Australian Commonwealth is to make the continent able to defend itself. Under an agreement with the mother country, it undertakes to equip and maintain a navy consisting of a battle cruiser, three unarmored cruisers, six torpedo-boat destroyers, and two submarines.

esque hillsides, or to the zoölogical and botanical gardens, which in Australian cities are used, not guarded by "keep off the grass" signs. The time is occupied by gossiping, reading, sewing, writing letters, playing simple games, eating lunch or supper, fishing, swimming, studying flowers or insects, or "plain resting."

America has much to learn from the Southern Continent of the use of parks and the attainment of recreation without the expense of country clubs and Coney Islands.

THE DAY LABORER IS KING

The day laborer, as opposed to the employer and to other workers, is king in Australia. The unions, through the labor party, practically control the executive, legislative, and judicial machinery of the cities, the States, and the Commonwealth. Much of the legislation enacted during the past ten years—for example, shortening of hours, increase in wages, restriction of child labor, safeguarding from accident, and employer's liability—finds its counterpart in the United States. Certain other features of industrial life are unfamiliar to Americans.

Forty-eight hours is the recognized maximum for a week's work; but in certain occupations forty-four, forty-two, forty, and even thirty-six hours are considered full time. Some of the larger building trades have a forty-four-hour week, and it is probable that this figure will become the recognized standard for all labor. Of the "four sacred eights" in the original slogan—"eight hours' work, eight hours' play, eight hours' rest, and

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A BUSH PATH IN NEW SOUTH WALES

In the well-watered sections of Australia the vegetation is thick and tangled and the early settlers cleared their land with great difficulty

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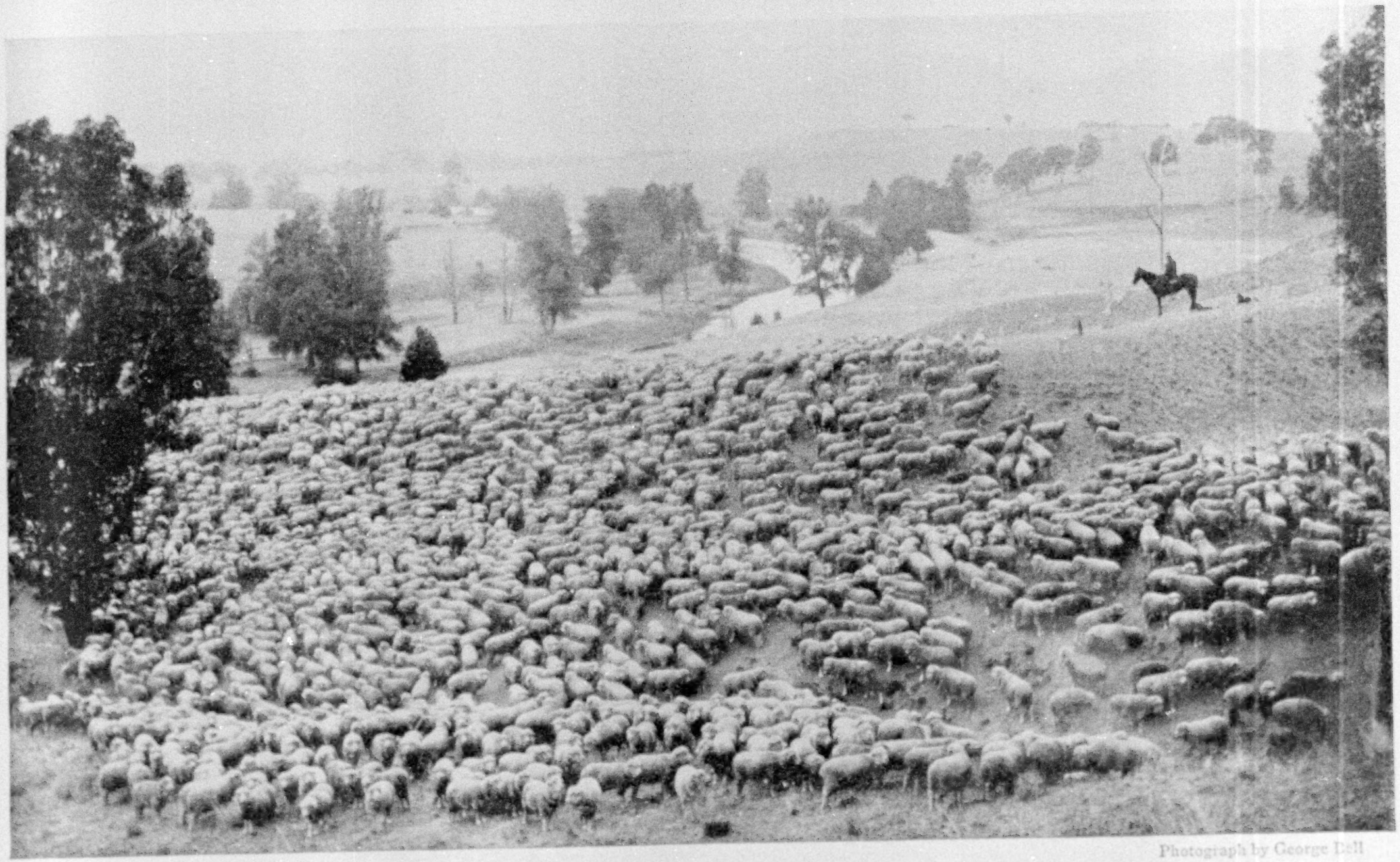
A BULLOCK-DRAWN LOGGING WAGON: NEW SOUTH WALES

They tell many a story about bullock drivers in Australia. Usually their language to the soldiering ox is about as sharp as the crack of their "black-snake" whips. But once a "bullocky," swinging his whip and preparing a whole machine-gun load of verbal shots to accompany its lash, perceived the mail-coach coming, and a clerical hat on the front seat. The whip dropped and the "bullocky" coughed politely, "Ahem, Strawberry, proceed." And to his obvious astonishment Strawberry did as he was told.



Photograph by George Bell

A FLOCK OF SHEEP ON A NEW SOUTH WALES RUN

"The shearers are concentrating. For 100 miles on every side every one knows that shearing begins at the central paddock. Orders have to be sent out weeks before to the back stations to have different detachments of sheep marched into certain places on certain dates. Regiment after regiment has to be shifted in like troops at a military concentration. When the final order arrives to have the sheep from White Dog paddock in at Emu paddock on Wednesday week, at Emu paddock on Wednesday week they must be; for it may be that on that very day they will send from the station to fetch 5,000 or 6,000 of those sheep into the wool-shed paddock."—"On the Wool Track."

eight bob a day"—only the portion relating to rest has been retained. Stores are forced, not permitted, to close at 6 p. m. on four days, at 9 or 10 p. m. on one day, at 1 p. m. on Saturday; but drug stores and saloons and restaurants are exempted.

After watching railroad laborers doing "the government stroke," it was easy to understand the opinion of contractors, who had had experience in the United States, Canada, England, France, or Germany, that the work accomplished in an eight-hour day in Australia was the equivalent of that performed in six and one-half to seven hours in other countries.

A LIVING WAGE DEFINED

The theory of the minimum wage is in practical operation. The fluctuating cost of living is recorded in detail by various boards and furnishes a basis for awards in industrial disputes. It is interesting to note the definition of a living wage as formulated by the Court of Industrial Arbitration of New South Wales in 1914:

"The living wage is standardized as the wage which will do neither more nor less than enable a worker of the class to which the lowest wage would be awarded to maintain himself, his wife, and two children—the average dependent family—in a house of three rooms and a kitchen, with food, plain and inexpensive, but quite sufficient in quantity and quality to maintain health and efficiency, and with an allowance for the following other expenses: Fuel, clothes, boots, furniture, utensils, rates, life insurance, savings, accident or benefit societies, loss of employment, union pay, books and newspapers, train and tram fares, sewing-machine, mangle, school requisites, amusements and holiday, intoxicating liquors, tobacco, sickness and death, domestic help, unusual contingencies, religion, or charity."

Elaborate legislative and judicial machinery has been devised to adjust misunderstandings between employers and employees and to prevent strikes and lockouts—an experiment which is attracting world-wide interest. In 1914 five hundred and twenty-two State boards dealing with disputes in various occupations were sitting and the docket of the Commonwealth courts were overloaded.

While many disagreements have been composed by these various boards, industrial unrest has increased to a discouraging extent, and the difficulty experienced by courts and boards in enforcing their awards, except as against employers, tends to nullify the effect of arbitration. The number of industrial disputes has increased since the Industrial Arbitration Act of 1912 became operative, and shows little diminution in consequence of the present war.

Judging from the New South Wales statistics, the parties to disputes prefer to fight it out. Of three hundred and thirteen "industrial dislocations" in this State for the year 1914, two hundred and forty-five were settled by "strife," forty-five by "arbitration," and twenty-three by "other means."

THREE AUSTRALIAN CITIES

While the visitor may feel that the Australian capital cities are sapping the life of the rural sections, he must admit their attractiveness. They are clean and are not overcrowded, and lack the congested districts of tenement houses. Parks are numerous, the streets are ornamented with trees, and an effort is made to decrease the natural ugliness of trolley and telephone poles and street lights. Gardens, which take the place of lawns, are everywhere present, and where the city meets the country the zone of ramshackle buildings and unkept yards, characteristic of many American cities, is conspicuous by its absence.

Sydney is the seventh city in size in the British Empire, being exceeded only by London, Calcutta, Bombay, Glasgow, Liverpool, and Manchester. It is about the size of Boston or St. Louis, two of the five largest cities of North America. Its population is exceeded in the Southern Hemisphere only by Buenos Ayres and Rio de Janeiro.

Sydney has grown spontaneously, like Boston, not according to a previous plan, like Washington or Salt Lake City. It has straight streets and crooked streets, long streets and short streets, boulevards and streets too narrow to permit double-

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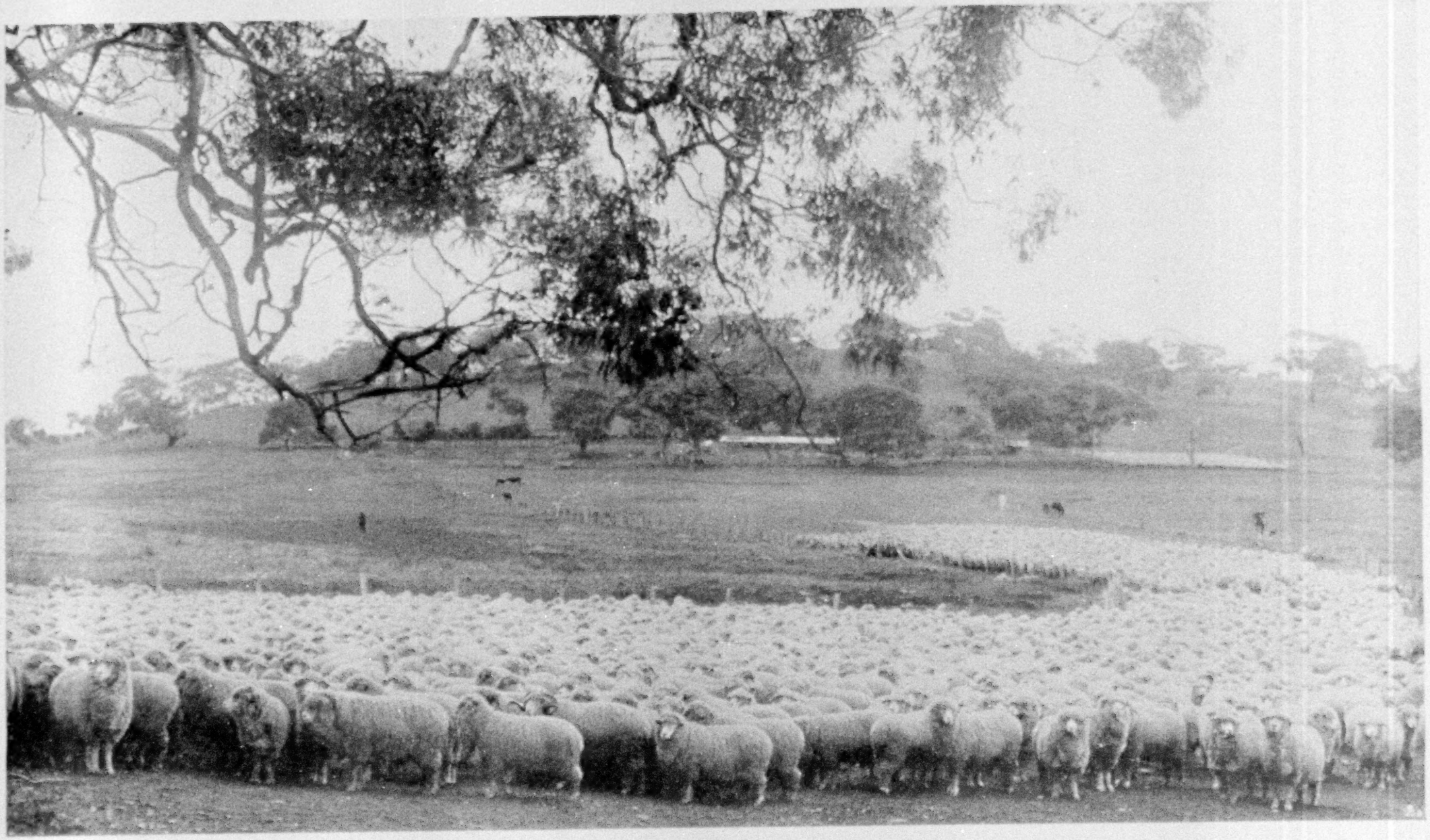

A FLOCK OF SHEEP ON AN AUSTRALIAN FARM

Until recently Australia led the world in the number of sheep, but now she has been forced to yield first place to Argentina. Just as the farmer and his fence have encroached upon the cattle lands of our western plains, so they are encroaching upon the sheep ranges of Australia, with the result that the number of sheep is declining from year to year.

Photograph from Boston Photo News Co.

PREPARING TO "DRAFT" A FLOCK OF SHEEP: NEW SOUTH WALES

Drafting sheep is the process of separating them. They are driven into the drafting yard, from which leads a runway wide enough for one sheep, with two pens at the end and a gate. By turning this gate to one side or the other the drafter is able to send a sheep into the one pen or the other. Each ewe has a right-ear mark and each wether has a left-ear mark. Expert drafters can work two and even three gates at a time, separating the sheep into three and even four pens and classes.

tracking. Some parts of the city are flat; in others the streets lead up and down steep little hills. There is no division into business and residential sections, or into "new part" and "old part," or "rich part" and "poor part." The soft buff-colored sandstone, so largely used in construction, gives a pleasing impression of age even to buildings recently constructed. It may be that the attractive informality of the life of the metropolis is a reflection of the city, or both may have resulted from the mild and fluctuating climate.

A KINDLY FATE

The surprising beauty and spaciousness of the harbor of Sydney, Port Jackson, its "deep water fingers stretching miles up between wooded banks," have often been described, but its commercial value is not so widely known. Fate never served an explorer a better turn than when it directed Captain Cook's course to the entrance of Sydney Bay, for it is the one place along a thousand miles of coast where access to the interior is easy.

In natural advantages it surpasses any harbor of the North American coast. The entrance is a channel one mile wide and 90 feet deep, walled by perpendicular cliffs of sandstone. Inside The Heads is an expanse of deep water covering several square miles and extending with slight decrease in depth along many miles of shore. Danger at the entrance, shifting sand-bars, shelving bottom, strong currents, and rough seas stirred up by winds are all lacking. In 1913 the total shipping business amounted to over 9,000,000 tons, a figure exceeded in the United Kingdom only by London, Liverpool,

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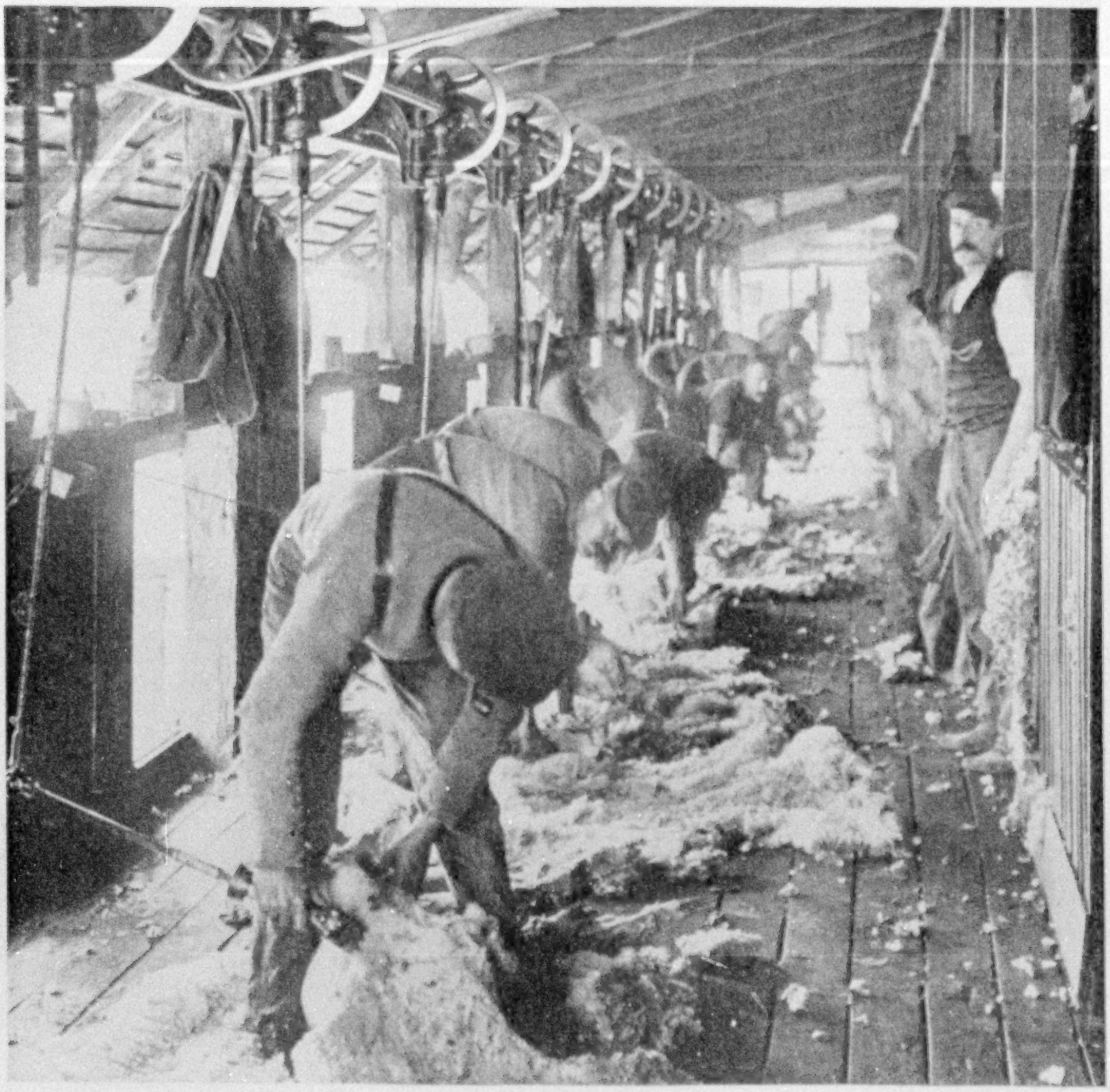


SHEARING SHEEP: JIMBOW, WEST QUEENSLAND

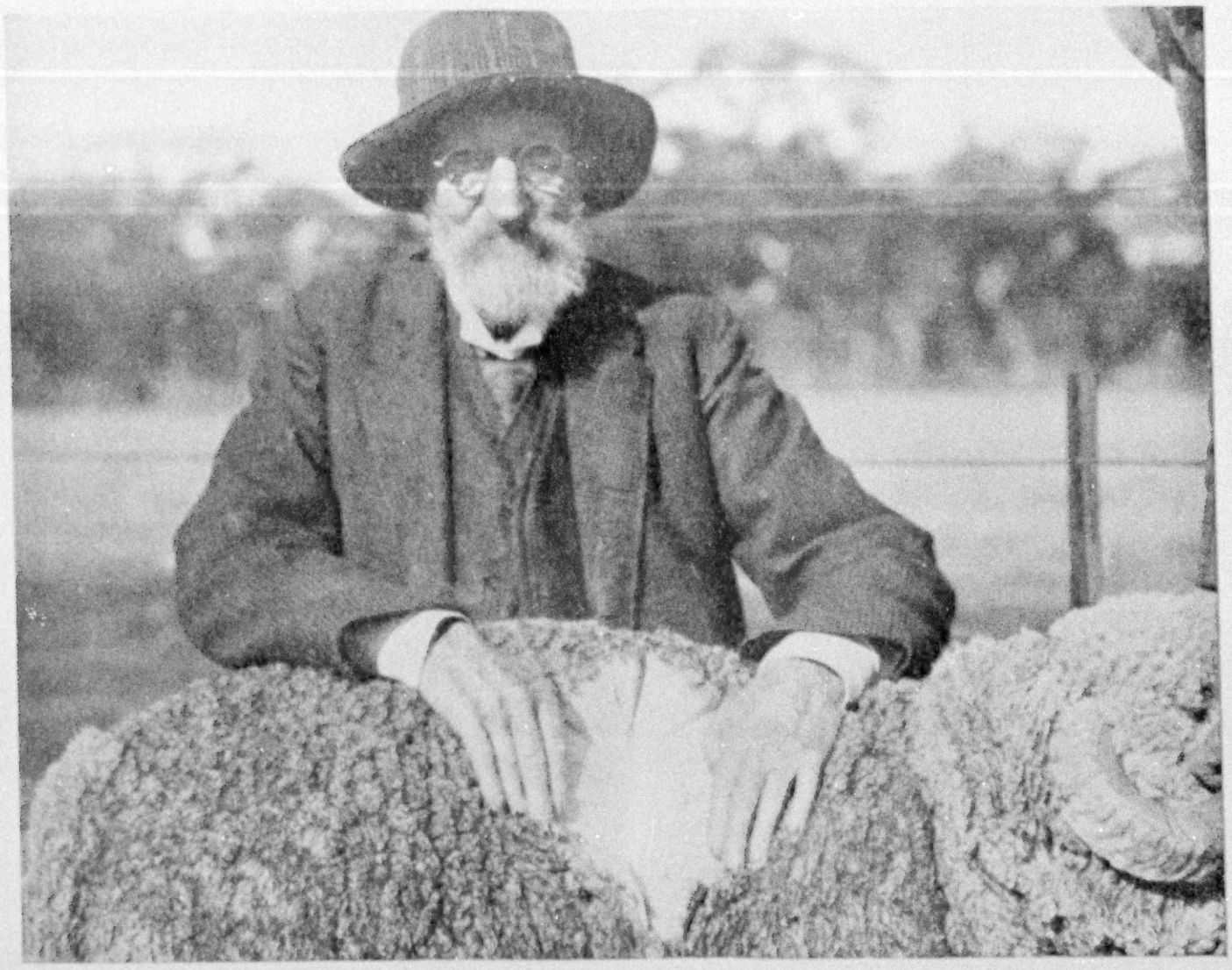
A good shearer will shear one hundred sheep a day and is paid six cents a head. The shearing season begins in July and ends in November. Men come from all parts of the world to become shearers, and they travel from sheep station to sheep station as the tramp printer used to travel from city to city.

Cardiff, and the Tyne, and in the United States only by New York and Duluth.

Melbourne's appearance speaks of ambition and faith in the future and reflects the exciting epochs in the history of Victoria. The groups of government and city buildings are admirably placed and include some imposing structures which rank with those of any American State capital. Railways are convenient, the parks and public gardens are large and numerous, well cared for and largely used.

Business is concentrated on a relatively small number of blocks bounded by streets 99 feet wide, feeding into parkways of twice that width, which seem to have been planned to secure fascinating vistas. Although the exaggerated prophecies of Melbourne's builders have not become realities, the feeling for greatness, and order, and convenience has been splendidly expressed.

Adelaide's unusual plan—a business section surrounded by a zone of 2,000 acres of park lands, beyond which are the residential sections—seems designed to put business cares, recreation and quiet home life in separate compartments. The organization of city life to allow for



AN ILLUSTRATION OF THE HEAVY, FINE WOOL OF AN AUSTRALIAN MERINO RAM
(SEE PAGE 533)

leisure—a feeling more prevalent in Adelaide than in Melbourne, or even in Sydney, and almost unknown in American cities—is partly responsible for the universal impression among visitors that Adelaide ranks high in general culture.

But climate and the high quality of the South Australian pioneers are also factors which have helped to make Adelaide such a desirable place of residence. Those who are attracted by the climate, people, and manner of life of the foothill cities of Southern California, who care for out-of-door life and flowers and fruit, and wish to spend week-ends in near-by mountains or at the seashore, would feel at home in Adelaide.

Most writers on Australia profess to see differences in types and manners in the three leading cities of the Commonwealth, and the natives feel sure that differences exist. Melbourne is "hustling;" Sydney is "easy-going"; Adelaide is "solid" and "contented." On the basis of short acquaintance these characterizations seem as unreal as "dead" Philadelphia or "provincial" Boston would to an Australian traveler. In the American sense, no Australian city is hustling; all are easy-going and contented; all are doing much business in an orderly, efficient manner. As places for residences, they have few competitors among cities of the United States.

THE AUSTRALIAN BUSH

The "bush" of Australia is the back country anywhere away from thickly settled communities, where life resembles that of the ranchman of New Mexico, the dry farmer of western Kansas, or the settler in a remote Colorado valley, whose daily round of duties involves energy, skill, and daring. The enemies of the bushman are not disagreeable persons who may be ignored or bought off or turned over to the police; they are heat and winds and floods—forces of nature to which man's resistance is feeble.

For the weak-hearted and the lover of

XUM

A WOOL SHED IN PORT ADELAIDE, SOUTH AUSTRALIA

The auctions of Australian wool markets often witness as lively bidding as on the New York Stock Exchange. The wool sold is contained in the big storehouses miles away. About a third of each lot is on the top floor, under bright skylights, each bale open, so that prospective buyers can inspect each lot before the sale begins and note on his catalogue the price he is willing to bid.

physical comfort and social companionship the battle with the bush is lost at the outset. The struggle demands self-confidence, a dogged refusal to be discouraged, a faith in the future of the country, and a profound belief that a man's life sacrificed for the good of coming generations is well spent.

A TYPICAL SHEEP STATION

Yalata, South Australia, is a typical sheep station of the better class. Parts of this ranch, which was formerly about the size of Connecticut, and still retains the generous proportions of 300,000 acres, are inclosed by dog-and-rabbit-proof fences and subdivided into grazing paddocks. The all-essential water is obtained from wells of uncertain yield, from storm-water "tanks," and from the roofs of buildings.

The ranch is a community in itself. There is a blacksmith shop, a carpenter shop, and a laundry, in addition to the familiar sheep pens and wool sheds. Besides the station-house—a roomy structure of stone and galvanized iron—there are outlying houses for workmen and huts for the families of "blackfellows"—docile dependents who are fed, cared for like children, and render a little inefficient service. Teams of camels bring in fuel and haul wool to the port at Fowler Bay (see map, pages 480-481) and pack-camels carry water to distant points.

There is not the bustle and long hours of labor common to American ranches, for the Australian employee has clearly defined working days. But the employer and his family are not restricted and their work is varied and arduous. The owner is incessantly busy with repairs, with examination of fences and water supplies, and keeps a cheerful and generous spirit in spite of the fact that hopes of financial independence, which had come within reach after years of isolation and struggle, were shattered by the drought of the previous year.

The women of the family, refined, educated and broadened by travel, are bearing the household burdens, running the store, post-office, and telegraph station, acting as nurse and medical adviser to women and children of the "blacks," and making life more endurable for the small ranchmen of the neighborhood, who had lost much through failure of crops and starvation of their meager flocks.

The ever-present temptation to "let things slide" is courageously resisted. Culture is shown in a collection of good books and musical instruments, in the appearance of the table, the leisurely ordering of meals, and the discarding from conversation of the cares of a busy day. Time is arranged for reading, for quiet gossip, and for interchange of ideas on a wide range of subjects. The dirt and annoyances incident to ranch life are kept outside of the home.

When a traveler comes along he is accepted on terms of equality, receives what the station has to offer, and is expected to give from his store of experiences. The bushman looking for work is passed along from station to station, hospitably entertained and supplied with provisions for the road.

For us hospitality was begun by the owner, who sent a cordial invitation 130 miles inland to our desert camp, and was ended by his daughter, who guided us on the 400-mile "track" to the boat at Port Lincoln.

THE LANDS OF COTTON AND WOOL

What America is for cotton, Australia is for wool. The Australian has no serious rival as a producer of Merino wool. In this favorable climate sheep multiply rapidly and produce the heaviest known fleece of the finest known quality. The fiber is fine, of great length, unusual strength, and therefore holds first place in the manufacture of high-grade cloths in England, Germany, and America.

With a satisfactory market assured for every pound of wool Australia can raise, it is natural to find all sorts of people trying their hand at sheep-raising. Lawyers, physicians, clerks, teachers, titled aristocracy, as well as farmers and stockmen, are enrolled as wool-raisers, and while the actual work on the run requires few men, the number indirectly connected with the wool and mutton business probably includes one-third of the population.

During a series of good seasons his returns are very great, but he must fight

Photograph by George Bell

CARTING WOOL TO BATHURST

The bullock teamsters charge about $20 a ton per hundred miles for hauling wool, the price depending largely on the supply of grass available along the road. Often the teams must cross vast parched plains several hundred miles broad, in which there is perhaps not more than one water-hole and one person to a hundred square miles (see page 535).

the dingo and rabbit, and a year of drought may mean complete loss of flocks. During the past ten years he has been called upon to give up his land to farmers and to pay the cost of political experiments designed to improve the lot of the day laborer in cities.

In 1913 there were 85,000,000 sheep in the Commonwealth; the value of wool exports alone was $128,000,000, or 65 per cent of the total pastoral products. In addition to wool, there was sent to market: mutton, $14,000,000; skins, $11,000,000, and tallow, $10,000,000; so that if all products of the sheep industry be combined, the total equals 40 per cent of all exports from the Commonwealth.

THE CATTLEMAN

As in America, the cattlemen of Australia occupy the outlying posts of civilization. They are "way out back" in the "Never-Never" country, or even "behind the beyond." The cattle roam widely over unfenced runs thousands of square miles in area. The average size of pastoral holdings in the Northern Territory is 275,000 acres. In West Australia one hundred people own together 40,000,000 acres, and Frazer speaks of a Queensland "cattle king" who held 60,000 square miles—an area nearly as large as all New England.

The events of the year are the "musters" (round-ups), when the "mobs" (herds) of cattle are assembled, counted, and sorted, the "clean skins" branded and suitable stock sent to market. But sending to market is a serious business. Two, three, or even five months may be required to drive cattle to the nearest port or railroad. Unless the season is favorable it cannot be done at all, for feed and water are lacking along the tracks. Even in good years forage is insufficient and water absent over long stretches of country, and herds of cattle started on the long drive may be greatly depleted by starvation and thirst, the remnant reaching their destination fit only for "boiling down."

A stockman told me of one of his mobs numbering 2,000 which succumbed completely to the hardships on an 800-mile drive (see also page 537).

STOCK ROUTES AND WATERING PLACES ARE MAINTAINED BY THE GOVERNMENT

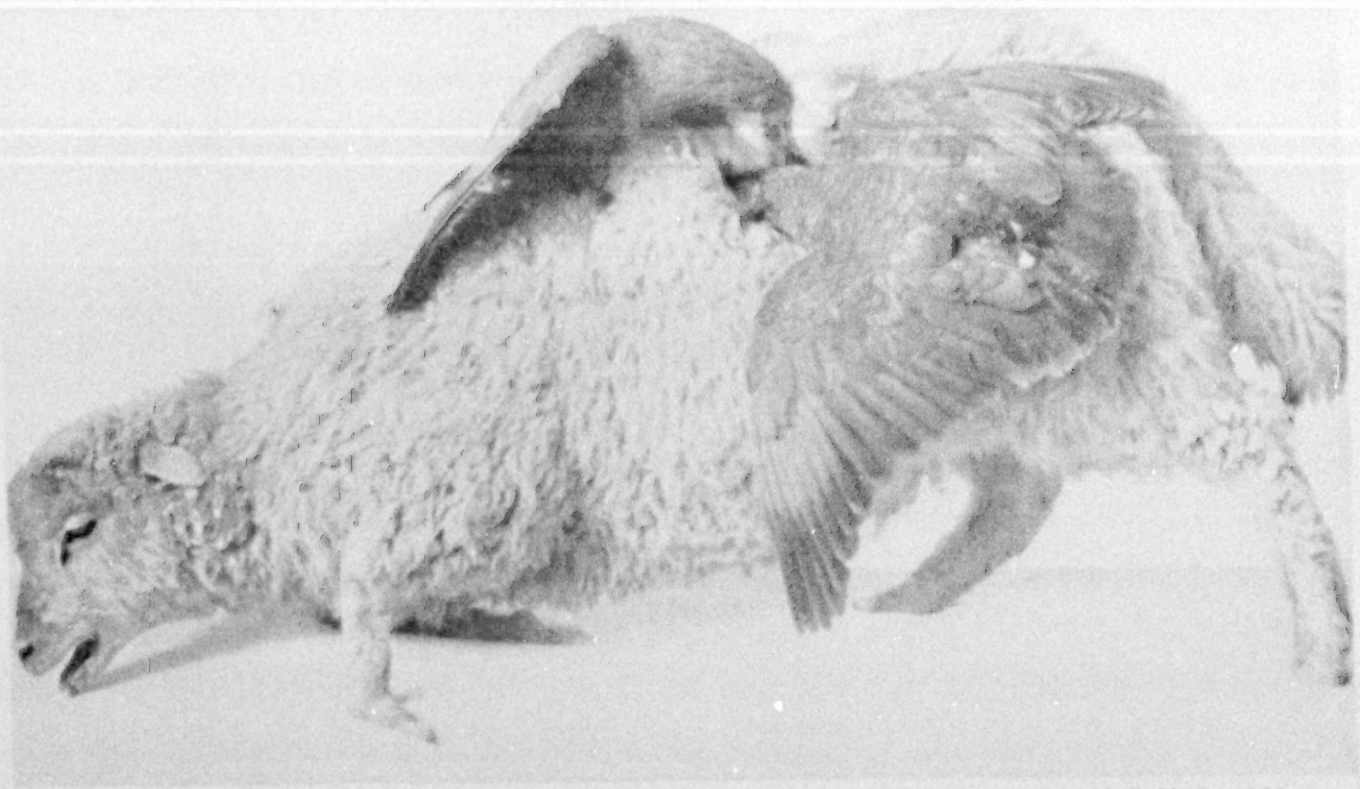
Stock routes are laid out and tended as carefully as wagon roads or railways. They head for the principal markets, or for the ends of railroads, which extend into the arid belts and wind across the country, taking advantage of all known water supplies. Streams, springs, billabongs, and gnamma holes are used, regardless of the quality of the water, for almost any liquid is acceptable in the desert.

When the distances between watering places are too great, or areas of feed are beyond the reach of water, artificial supplies are provided and kept under surveillance. In places wells are dug; elsewhere reservoirs and tanks designed to collect storm water of infrequent rains are constructed. Many of these are built below the surface and covered to check evaporation. Where other means fail, skeleton buildings with large roof area are constructed to conserve rain-water.

A land-office map of an Australian State is decorated with a network of crooked lines, main arteries with branches, along which are indicated at distances of 10 to 40 miles the watering places and camping sites maintained by the government. These stock routes cover the continent like a system of railways, for which they form a substitute, and their construction and maintenance is a highly important function of the States.

In New South Wales 6,000,000 acres are reserved for this purpose, and seven hundred public watering places have been constructed, three-fourths of them tanks and reservoirs. In South Australia routes extend from Port Augusta to the borders of Queensland and West Australia, and into the heart of the Northwest desert for a distance of 700 miles. One route crosses the State and continues through the Northern Territory to the northern edge of the continent. West Australia likewise maintains 2,000 miles of stock routes leading from inland stations to the cities on the Southwest coast.

While farmers in the new country were few or absent, the cattlemen secured the land. They were powerful financially



Photograph of specimen in U. S. National Museum

A KEA, OR MOUNTAIN PARROT, KILLING A SHEEP: NEW ZEALAND

In this bird we see the harmless, vegetable-eating parrot transformed into a vicious bird of prey within the space of a few decades. Having gotten a taste of sheep fat from the frozen carcasses hanging on the meat gallows at the ranch houses during the cold winters, they soon learned to attack the live sheep. These attacks became so frequent that a bounty had to be put upon the head of every kea.

and politically and practically controlled the State parliaments. Laws favoring the large landholder were passed and acts designed to protect the small holder often were nullified. By the familiar processes of bogus competitive bidding, exaggerating the value of improvements, employing dummies, and choosing choice bits of land in such situations as render large adjoining areas useless for purposes other than grazing, the 640 acres which an individual might lease under the law could be indefinitely expanded.

DUMMY LEASE-HOLDERS

In one case the purchase of 27,000 acres in forty-acre blocks scattered broadcast over the run effectually secured an area of 258,000 acres, and by the transference of dummy leases four squatters obtained control of 55,000,000 acres, not in the arid region, but in the heart of New South Wales. The situation was complicated by large free grants of the choicest land in the Commonwealth—grants given to army and navy officers, to favored politicians and promoters.

Settlement by farmers was delayed also by a strange economic theory that the way to colonize was to sell land at a high price, using the proceeds to bring out more colonists. By keeping the land beyond the financial means of the average immigrants, a "nicely graded society of landlords, yeomen, and laborers" could be established!

That the problem of regaining for the people the enormous holdings already alienated to wealthy stockmen and absentee landlords is under vigorous attack is shown by the bewildering mass of legislation enacted during the past twenty years.

The significant difference between the present Australian and American practice is that the public lands of the Commonwealth are in general leased, not given away or sold. Free land to which unrestricted title may be obtained by settlement and cultivation is now unknown in Australia. On lands not previously occupied the farmer secures possession by a five-year residence and the payment of a small annual rental—a figure subject to

change after a stated period. If his land is part of a larger holding purchased by the State, the settler pays the price in the form of long-term loans.

Since much of the desirable land is included in large estates, the amount available for settlement is measured by the ability of the government to purchase holdings at their present high valuation.

THE SOURCE OF HER WEALTH

The position of Australia as the leader among nations in average wealth per head of population is largely the work of the stockman, who has made good use of his opportunities; his wool, and mutton, and beef, and hides are known in every world market.

The Australian wheat-grower, like the sheep-rancher, is master of his craft; he uses the most modern machinery, imported from abroad, and has developed implements of his own, including the well-known stripper-harvester used in other wheat-growing countries. Under the guidance of scientific leaders, he has increased the yield and improved the quality of his crop, and has developed new varieties suited to the climate. In brightness and hardness of grain, in milling qualities and in whiteness of flour, his wheat stands unequaled, and therefore ranks first in value per bushel in foreign markets.

Oddly enough, the handling of Australia's wheat crop is still in a primitive stage. It is put in bags in the field, hauled in bags to the railway station, carried in bags on the train, and remains in bags during its oversea journey to market.

Instead of the familiar grain elevators of the United States and Canada—big ones at terminal points, small ones scattered along the railways—the traveler in Australia sees bags stacked by the hundreds at nearly every station and accumulated by thousands at the larger shipping points. Stacks containing 100,000 to 200,000 bags of wheat are not unusual sights at South Australian ports (see page 540).

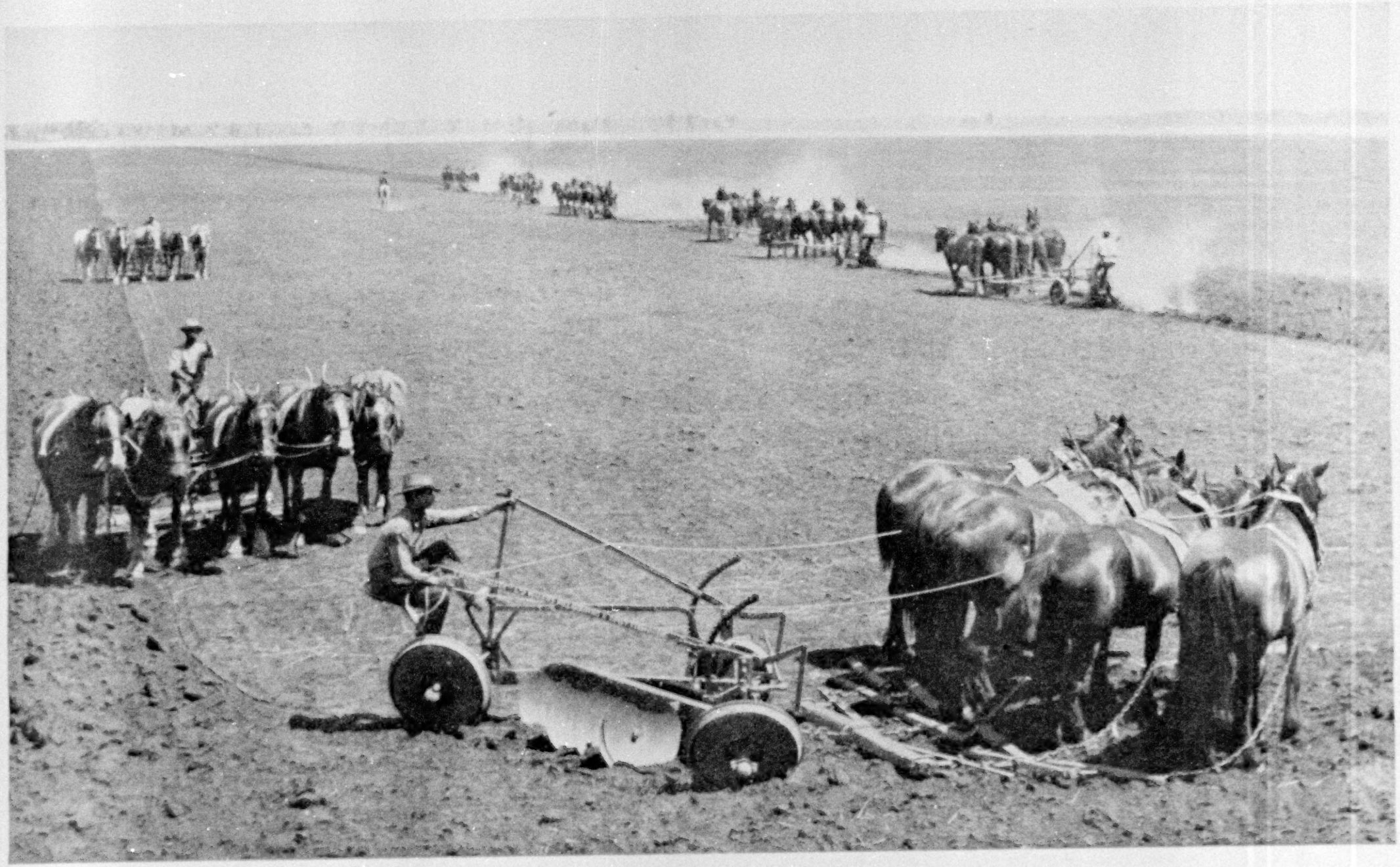
That Australian agriculture is an infant is shown by the fact that the land under cultivation is 14,700,000 acres, less than half that of Kansas and an insignificant fraction (0.77 per cent) of the area of the Commonwealth. That the tropics are practically uncultivated, and the area with rainfall between 10 and 20 inches little utilized, is to be expected, for these conditions prevail in other countries, and the treatment of such lands may be left for the future; but it occasions surprise to find that nearly 300,000,000 acres in the temperate zone, receiving over 20 inches of rainfall—land like that of Tennessee, Nebraska, and Oregon—should remain idle (see p. 545).

The Commonwealth is suited for all the crops of the temperate and tropical zones, and on the small area cultivated nearly every known kind of grain, fruit, and vegetable is grown. Many varieties of fruit trees and vines thrive even better in Australia than in the countries from which they were introduced, and the climate is such that lemons and oranges and the finer varieties of grapes may be grown in all the States on the mainland.

MORE ANIMALS PERISH THAN IN THE DAYS OF THE MURRAIN

The Australian farmer and fruit-grower and ranchman are practically free from the fear of frosts, but instead they must contend against a more bitter foe—the drought. In other countries droughts when severe are local. Australia alone is subject to visitations (fortunately rare) which travel like a scourge from one end of the continent to the other. Those who have experienced a drought on our western plains, when growth of vegetation not only seems to be suspended completely, but grass withers to the roots, may form a picture of the disaster attending a severe drought extending, as it were, from California to New York, with only the mountains and parts of New England and Washington retaining their coating of green.

Ten of the twelve droughts recorded for Australia since 1880 affected chiefly the inland areas, where the rainfall is normally below 25 inches; but the great drought of 1902-1903, which marked the culmination of five unfavorable years, affected the entire continent. In one year 15,000,000 sheep and 1,500,000 cattle perished, and the whole drought period saw the death of 60,000,000 sheep and 4,000,-



STARTING THE PLOWING SEASON AT NARROMINE, NEW SOUTH WALES

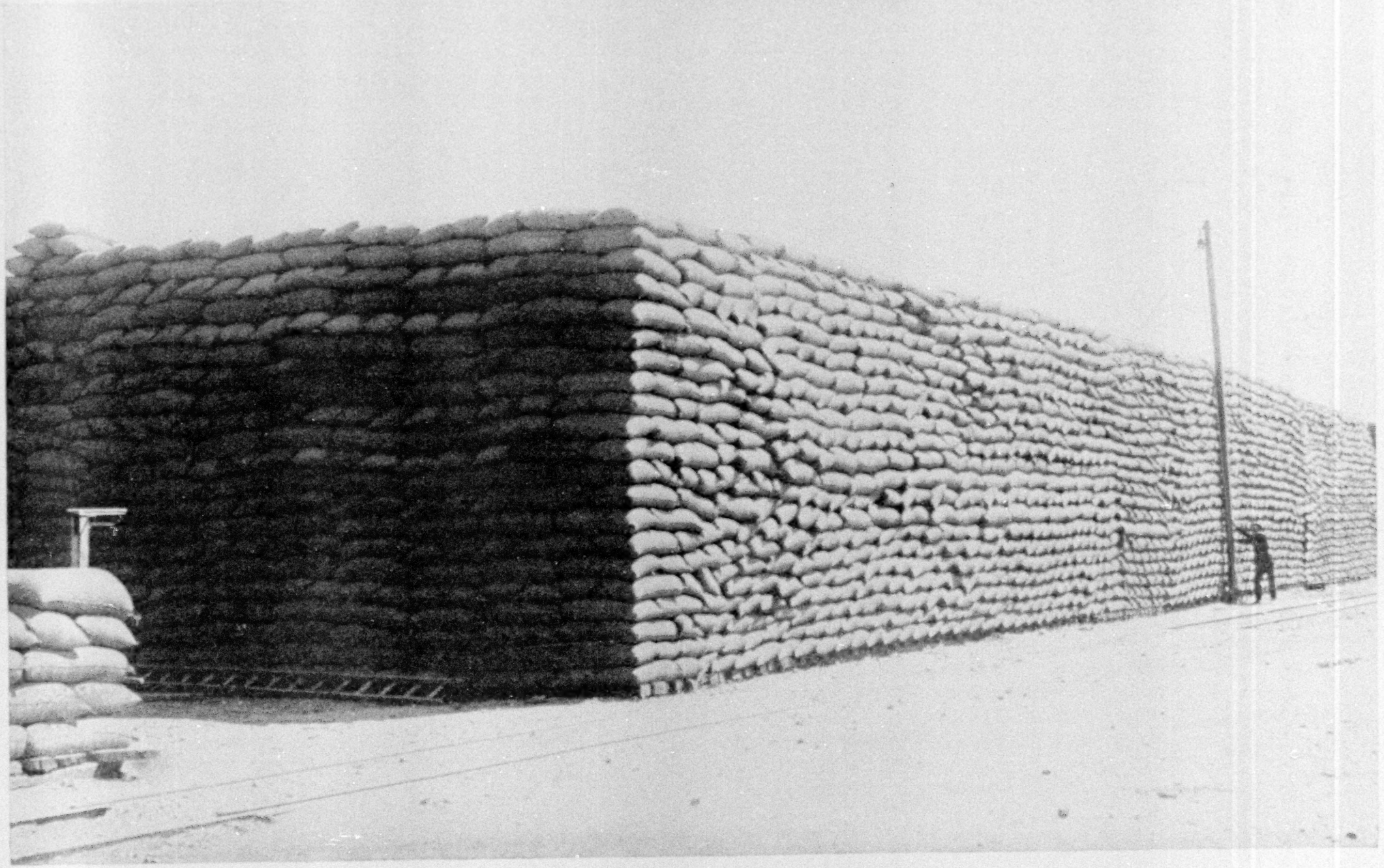
Australia is the most level in surface and regular in outline of all the continents, and even of most large islands. It is also the lowest continent, with an average elevation about that of Ohio.

XUM

Photograph from Janet M. Cummings

CARTING WHEAT IN THE MALLEE DISTRICT, NORTHERN VICTORIA

The Mallee district consists of about 11,000,000 acres of bush territory in temperate Victoria. It has a fair amount of rainfall, and when the scrub is cleared off makes excellent farming land. By a system of farm loans this can be carried out by settlers, the government lending a fixed amount for every ten acres cleared. Much wheat now grows where once the bush reigned supreme, although more than half of the district is still open to settlers.



200,000 BAGS OF WHEAT STORED FOR SHIPMENT: PORT WAKEFIELD, SOUTH AUSTRALIA

Owing to the dry weather in the harvest season, the wheat can be stacked for shipment. Unlike ours and the Canadian crops, grain in Australia is handled in bags; elevators are not used (see page 537).

000 cattle from starvation and thirst. Mining operations were checked for lack of water. The wheat production fell in one year from 38,000,000 bushels to 12,000,000 bushels, and flour, as well as other foodstuffs, were imported. Many people left the country, the excess of departures over arrivals for the period 1901-1905 being 16,800. The birth rate decreased; the death rate increased so that the increase in population dropped to 1.38 per cent, the lowest in the history of the country.

Nothing shows better the temper of the Australians and the marvelous recuperative power of soil and stock than the rapid recovery from this overpowering disaster. During the drought "the black-soil plains of the Darling were reduced to dust, without vestiges of herbage for miles. Within a week they were covered with green, and in a few weeks there was luxurious pasturage."

In the year following the drought 74,000,000 bushels of wheat were harvested, and the fields of New South Wales, which had returned about two bushels to the acre in 1902, returned 15 to 17 bushels per acre in 1903. Within three years the flocks of this State, which had lost 17,000,000 head during the drought, had increased from 23,000,000 to 40,000,000, and the number of cattle and horses had doubled; and by 1905 the number of sheep and of cattle in the Commonwealth exceeded that of 1900.

THE RABBIT PEST

The Australian farmer and ranchman originally had little to contend with in the way of native prolific weeds and predatory animals; but, unfortunately, Australia, like the United States, has suffered from misguided efforts to introduce new species of plants and animals. The cactus finds a congenial home. Its myriad seeds are spread by birds, by wind, and through the involuntary efforts of cattle and sheep. It plays the part of the Russian thistle on our western plains, and, thriving as it does in most any soil and climate, has so far defied the efforts of the bushman who by ingenious systems of burning, burying in pits and poisoning, have courageously attacked the pest.

Foxes and also rabbits have been introduced, for the transplanted English squire must have his sport, and the hunting of kangaroos and wallabies and wombats furnish about the same excitement as killing a herd of defenseless buffalo or cornering woodchucks on a New England farm. Foxes have outlived their usefulness; they take an annual toll of about 100,000 sheep, and are now more dreaded than the dingo.

Likewise the enthusiasm with which the harmless-looking rabbits were turned loose has been replaced by sincere regret. The joyous sport of "hunting the hare" has become the discouraging and expensive task of exterminating "vermin." Within a few years after their introduction rabbits were overrunning the country. They appropriated the forage for sheep and cattle and threatened the extermination of the native fauna because of the loss of its food supply. Like swarms of locusts, they swept parts of the country clean of vegetation, destroying the bushes and eating the grass down to its roots. Not only were the agricultural lands and sheep "runs" infested, but vacant land in the suburbs of the cities was honeycombed by these industrious little miners.

MORE THAN 100,000 MILES OF WIRE FENCES BUILT TO CHECK RABBITS

Liberal bounties and wholesale poisoning and hunting with packs of tamed dingos failed to check the spread of the remarkably prolific beast. Hundreds of thousands were killed, but millions were born each year. There was some hope that a severe drought might exterminate them or at least deplete their numbers to the point where a vigorous attack might be successful. It was found, however, that though during droughts their corpses were thickly strewn over "back blocks" and along dry water-courses, they quickly reappeared with the coming of the rains. The introduction of parasites was also without result, and it seemed for a time as if agriculture and grazing were doomed over large parts of the continent.

As a last resort, the scheme of fences, which gives to an Australian land map such an unusual appearance, was devised. As described in the South Australian Act of 1914, the "rabbit-proof fence" is made

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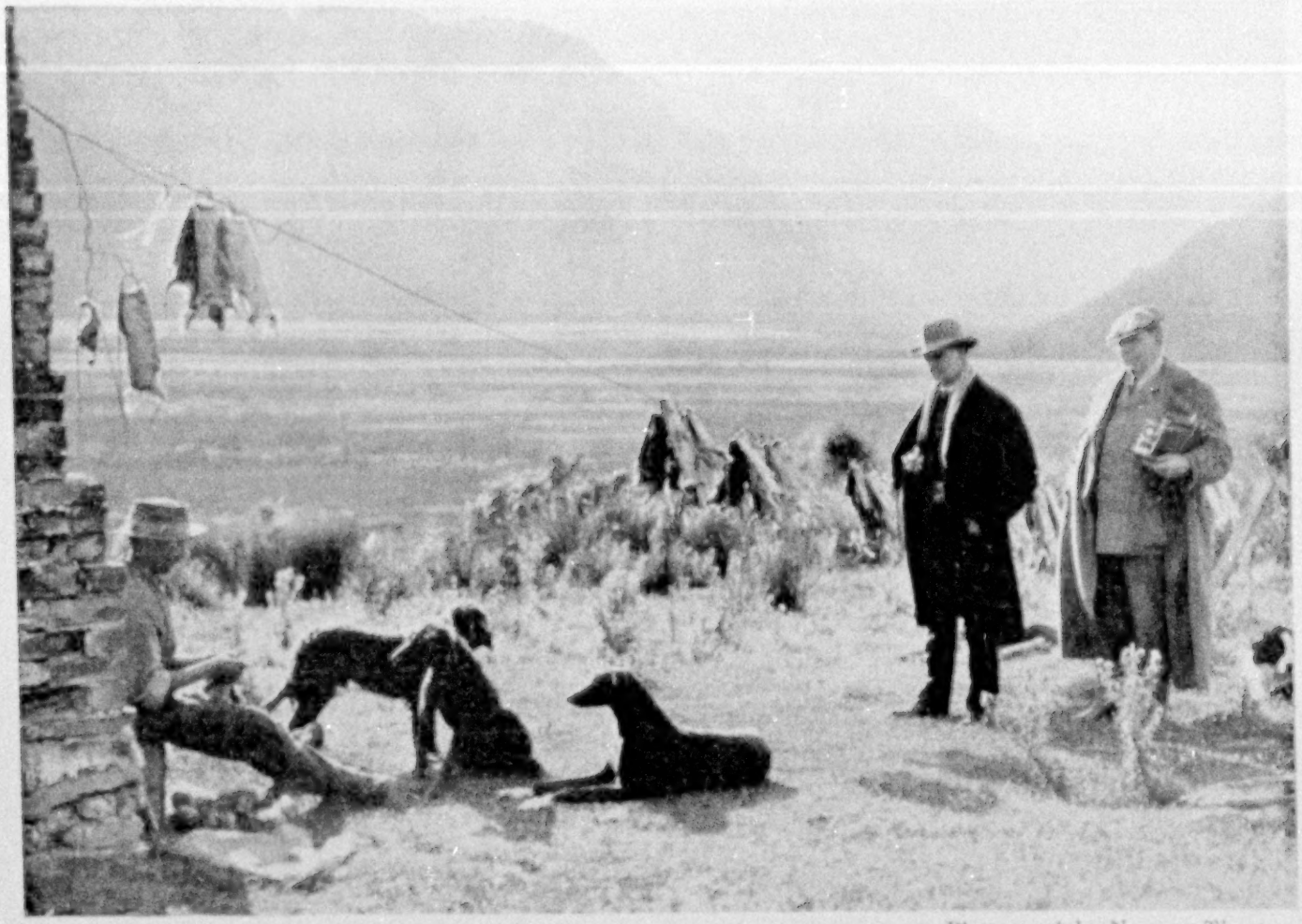


Photograph by Norman Thomas

AN AUSTRALIAN RABBIT TRAPPER

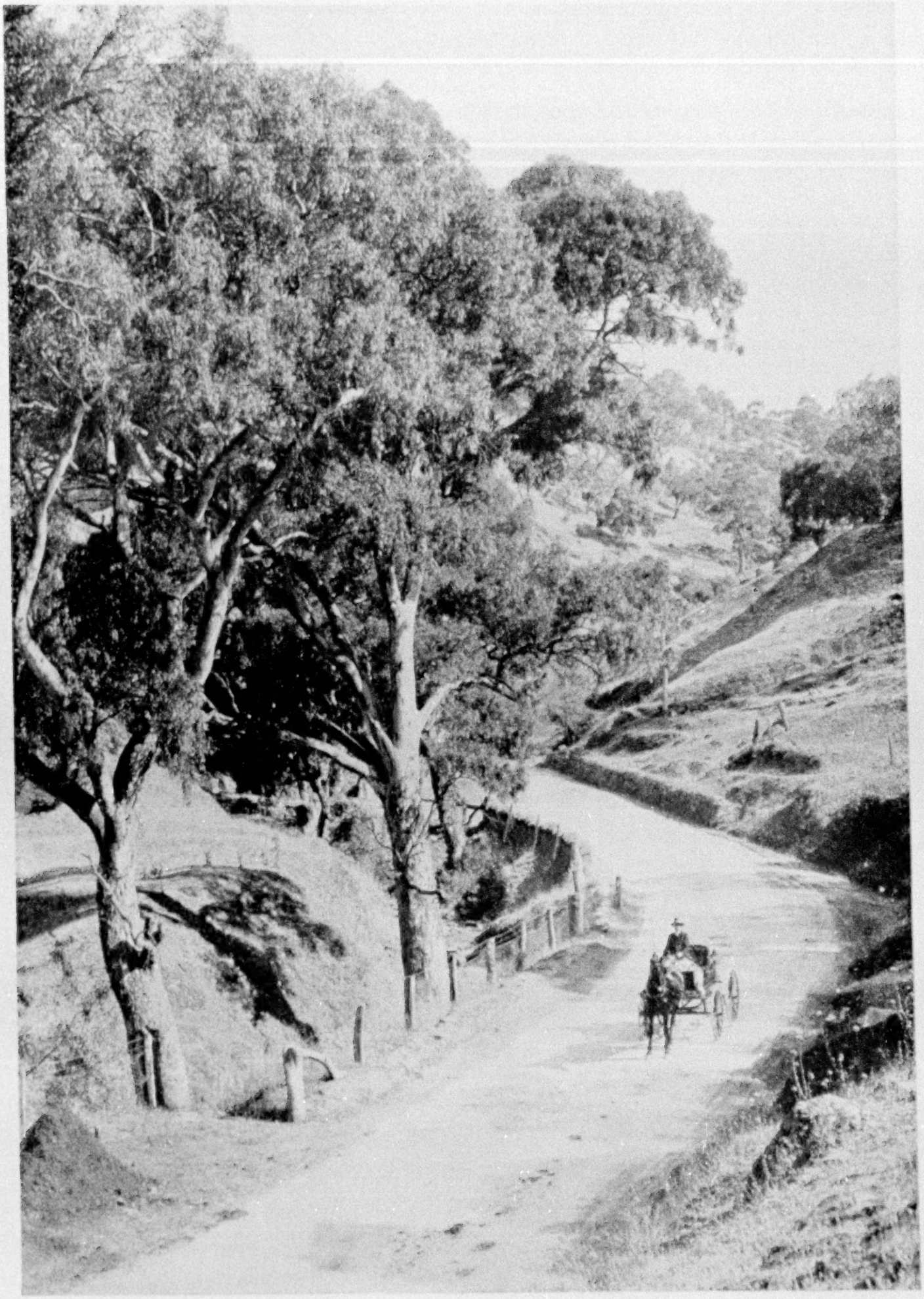
An Englishman, moving to Australia, desired to give his farm a homelike air, so he took along some rabbits. They began to spread like the English sparrow in America, and soon the fertile parts of the country were overrun. The rabbit march inland was that of a pitiless vandal army, for, in the dry years, not content with nibbling the grass of the sheep and cattle stations to the point where it would not make goose pasture, they ate it out by the very roots, barked all the trees, and left nothing but blank desolation behind them. Poison was tried, special machines being devised to sow poisoned grain in furrows where the rabbits would burrow for it, but the sheep and cattle would pass it over. But it came nearer to killing off all the birds than it did the rabbits and was abandoned. Now rabbit-proof fences and bounties hold the rabbit plague in check.

of wire netting 3 feet wide, set 4 inches into the ground, and topped by a strand of barbed-wire placed above the netting. A "vermin fence," designed to prevent the encroachment of "rabbits, wild dogs, and foxes and any other animals which the governor, by proclamation, declares to be vermin," is built like a rabbit-proof fence, but reaches a height of 4½ feet and includes three strands of wire at the top. Especially designed gates are used on highways and the penalty for leaving one open is justly severe.

The cost of these fences is enormous, for distances are great, construction is expensive, and they must be continually patrolled and repaired; but the need is imperative and the work has been vigorously pushed. Vermin fences run through woods, cross vacant fields, and stretch far out into the desert. They border stream channels and follow the shores of the great salt lakes, dividing the country into a series of irregular blocks.

The State of South Australia has, since 1891, erected 29,148 miles of fence, enough to encircle the globe and with the remnant build a double line of fence along the southern border of the United States. When contracts now running are completed the mileage will be much increased. New South Wales has expended over $27,000,000 for rabbit extermination and has within its borders 98,000 miles of fence. One of West Australia's fences extends entirely across the continent.

Of late years the rabbit has been repaying in part for his keep — paying board, as it were. He goes to swell the



A RABBIT FENCE ON THE BARKER ROAD NEAR GLEN OSMOND, SOUTH AUSTRALIA

More than one hundred thousand miles of rabbit fences had to be built to put a check to their ravages. It is said that they were once so numerous that three million were poisoned at a single water-hole in one of the drought years. At some places the paths they wore in going down to the Darling River are declared by C. E. W. Bean, author of "On the Wool Track," to be two feet deep (see page 542).

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TWO AND A HALF TONS OF BUNNIES: TARANA STATION, AUSTRALIA

The rabbit now has only the poor lands bordering the desert, which it is unprofitable to fence, for his own. But even here the professional rabbit trapper and his dogs assail him. For rabbits are now sent frozen to England, their carcasses for food and their skins for furs and felt.

total of food exports from the Commonwealth. Along the country roads rabbits may be seen hung on the fences awaiting the passage of the rabbit carts which convey them to the packing-houses to be prepared for shipment as frozen meat and hides. Practically all are exported (the Australian does not eat "vermin"), and during 1913 frozen rabbit and hare to the value of $1,400,000 and skins to the value of $3,000,000 were sent from Commonwealth ports.

SAVING A SCANTY RAINFALL

On the assumption that a temperate climate and 20 inches of rain be required for Australian agriculture, there is available for crops only 480,000 square miles, 307,000,000 acres, or 16 per cent of the continent. As thus viewed, Australia for the farmer is somewhat larger than Germany and Austria-Hungary and equal to the combined areas of Louisiana, Texas, Oklahoma, Kansas, Nebraska, and South Dakota (see also page 537).

There remain, however, within the temperate zone 347,000 square miles, or 860,000,000 acres, with rainfall less than 20 inches. How may this enormous area in the temperate zone of good soil and favorable temperature be reclaimed for farming, or at least made available for grazing? As might be expected from the spirit of the Australian people, this prodigious task is being vigorously attacked. Much is being done with dry farming and by the selection of drought-resisting plants; but the hopes of reclaiming desert lands to agriculture are based, as in the United States, on irrigation.

The problems which confront the Australian reclamation engineer are exceedingly difficult. Of mountain ranges suitable for collection of water there is one—a plateau-like affair, 2,000 to 4,000 feet high, with knobs here and there reaching above 6,000 feet, but without important accumulations of snow. The range is so near the Pacific coast that no large belts of agricultural land are found on its well-watered eastern slopes. The task before the Australian is comparable with that involved in irrigating Arizona and New Mexico after the Rio Grande, the San Juan, the Colorado, and the Gila had been eliminated and the mountains now furrowed by living streams reduced to ridge-dotted plains.

One of the world's great irrigation schemes, and the most ambitious yet undertaken by Australia, is the impounding of the waters of the Murrumbidgee, one of the chief tributaries of the Murray. This project, which is rapidly nearing completion, involves the construction of the great Burrinjuck dam—240 feet high, 780 feet long, with a width of 18 feet at the crest. Though its dimensions are less, it is a fair rival of the Roosevelt dam of Arizona, which it resembles in structure and setting. The artificial lake formed at Burrinjuck is 41 miles long.

From the dam the water is to be led down the channel of the Murrumbidgee 200 miles to Berembed, where it will be diverted among 250,000 acres of choice farm lands which are now awaiting settlement.

Unlike the American system, which limits governmental control of irrigation projects to the selling of water and land, the government of New South Wales becomes the parent of an irrigation colony. It plans and builds villages, lays out and controls race-courses and athletic fields, builds houses and fences, sells trees and seed and lumber, loans money, stock, and agricultural implements, grants reduced freight and passenger charges on railways, builds and operates butter factories, cheese factories, and canneries, and provides scholarships at the university.

THE LARGEST ARTESIAN BASIN

Beyond the reach of streams from the coastal mountains, the land stretches westward for nearly 2,000 miles without encountering water sufficient for irrigation. Part of this vast area is available for dry farming if domestic and stock supplies can be obtained, and large areas are suitable for cattle and sheep if only water can be found.

Drilling for water in arid regions has revealed the largest artesian basin in the world, covering 499,000 square miles. From this basin New South Wales has obtained 468 flowing wells, ranging in depth from 46 feet to 4,338 feet at the

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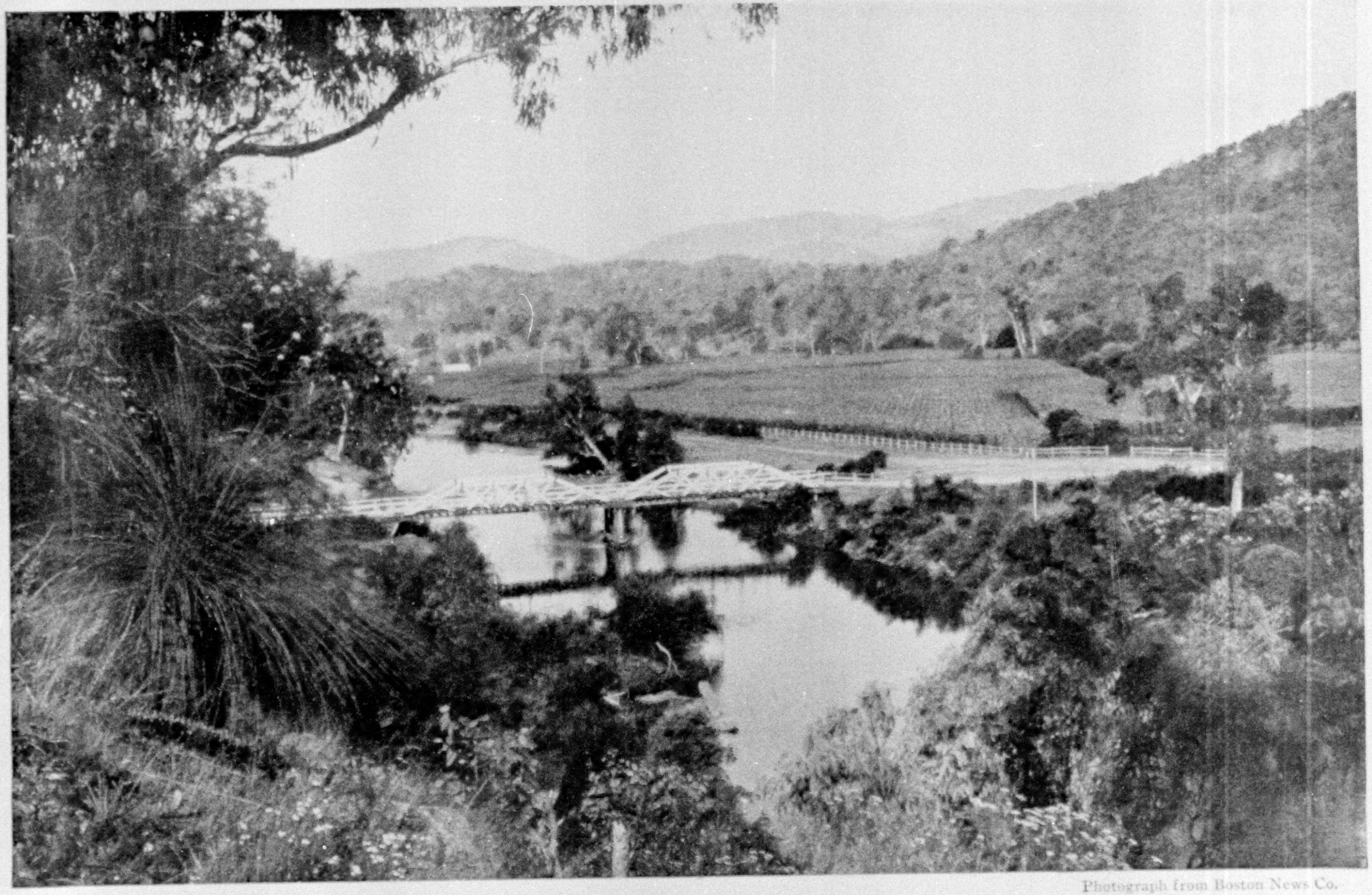


Photograph from Boston News Co.

A FARM IN A SHELTERED VALLEY: TUMUT, NEW SOUTH WALES

Insufficient moisture prevents agriculture in the greater part of Australia, but where rainfall suffices the land is enormously productive

Boronga bore, which yields over 1,000,000 gallons daily. In this same basin Queensland has 985 flowing wells, 64 of which are classed as yielding over 1,500,000 gallons per day and 6 over 3,000,000; twelve of them are over 4,000 feet deep, and the Bimerah No. 3 was sunk to a depth of 5,045 feet.

Water from these deep wells is naturally hot. Temperatures between 120° and 150° are fairly common, and eight wells of Queensland furnish water above 190°.

The temperature of well water is unimportant, but its quality is a factor of moment, and unfortunately the water from many of the deep wells contain alkali or salt in quantities which render them useless except for stock which have become accustomed to impure water. It is most discouraging to obtain at great expense a well of large flow only to find its waters unfit for irrigation or domestic use. The grip of the desert is felt not only on the surface, but at depths below.

THE PROBLEM OF THE TROPICS

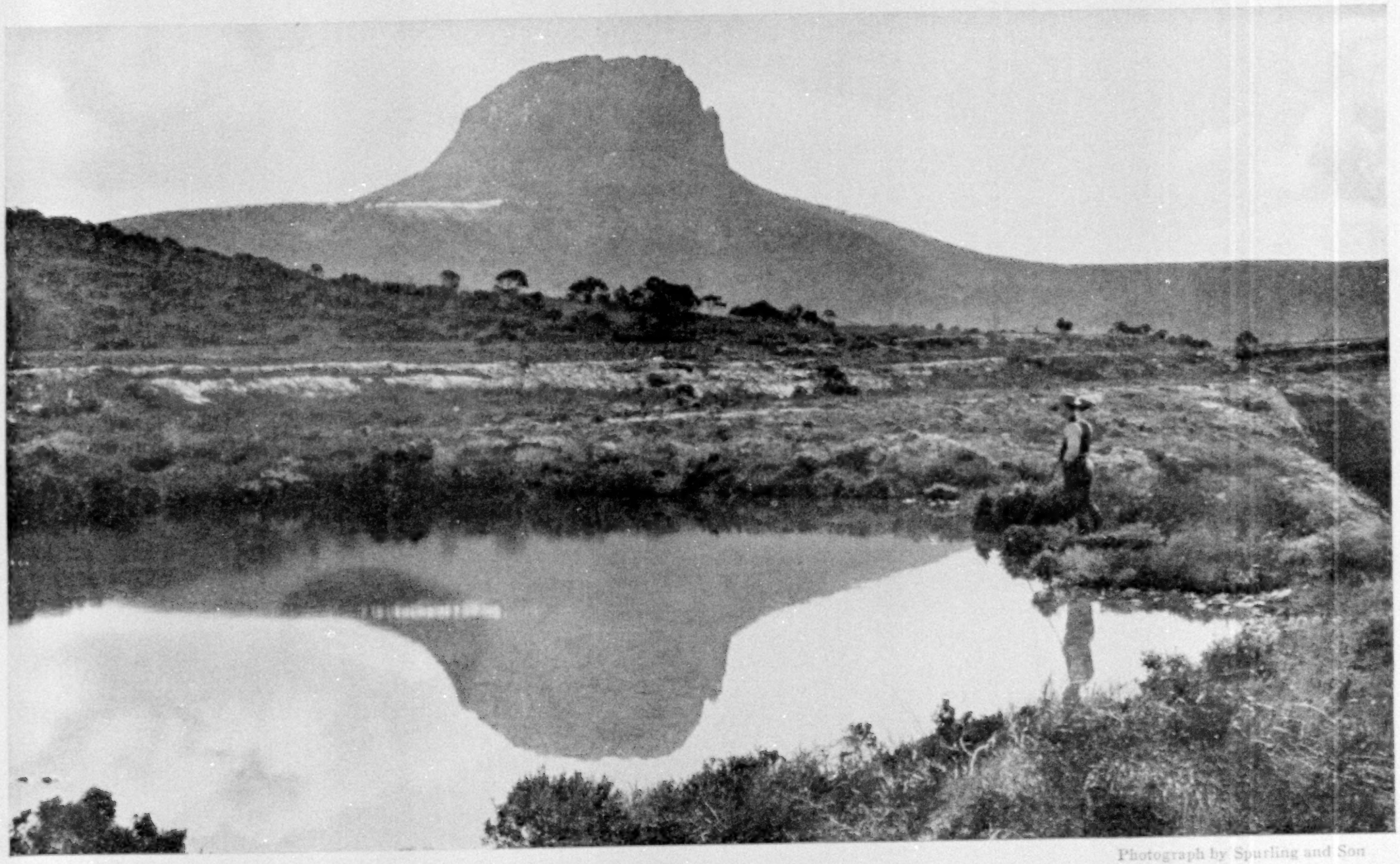
The northern edge of the Australian continent corresponds in latitude to Costa Rica, the coast of Venezuela, and the central Philippines; its southern edge, excluding Tasmania, has about the position of Washington (D. C.), San Francisco, Peking, and central Portugal (see map, page 477). The portion of the continent within the tropics is therefore large—38.6 per cent of the lands of the Commonwealth—but conditions are such that even the Malays have found it less attractive than the more tropical regions farther north.

In the Northern Territory the natural obstacles are too serious to be overcome without capital and expert knowledge. The summer monsoon, caused by overheating of the great desert belt in the center of the continent, brings heavy rains during the three summer months, culminating in January. During this season grass literally bounds up, some varieties attaining heights of 10 feet in three months—so coarse and rank as to be useless for stock—and must be removed by burning. The ground becomes so soaked that traffic is impossible, farming implements are bogged, and river flats with good soil are submerged. These flood conditions are succeeded by drought, and from March to October the monthly rain is measured by fractions of an inch, and in some years fails altogether. On leaving the coast the rainfall rapidly decreases and desert conditions prevail over nearly half of the area within the tropics.

The few settlers in the Northern Territory are making an heroic struggle in this unfavorable environment. Port Darwin, the capital city, on one of the best harbors in the world, is a village of iron houses, with a population of about 1,000, less than half of whom are whites, and the white population of the territory, the size of three Swedens, is about 2,000. It is reached by steamer from Brisbane—an eight to eleven days' journey, and access to the back country is attained by a narrow-gauge road, running trains semi-weekly to Katherine River, 200 miles; by two boats a year, subsidized to visit coastal ports on the Gulf of Carpentaria, and by pack-horse mail, whose going depends upon seasons and the state of roads. The distance inland to the nearest railroad at Oodnadatta is 1,300 miles, and a large part of the cattle are driven 1,000 miles or more to market.

The coast of northern Queensland is truly tropical; its heat and humidity are high. The average annual rainfall from latitude 25° northward is over 50 inches, and for about 100 miles of coast exceeds 90 inches. At Harvey Creek it is 165 inches, and annual falls of 211 inches at Innisfail, 238 inches at Harvey Creek, and 241 inches at Goondi have been recorded. On twenty-two different occasions single downpours exceeding 17 inches have been experienced at various stations. These superabundant supplies furnished by monsoons and trade winds unfortunately are not distributed inland, but are confined to the coast by mountains. More than one-half of Queensland is within the tropics, making an area larger than Central America, Cuba, Jamaica, and Porto Rico combined.

The story of sugar is an important phase of the problem of the tropics. This industry in tropical Queensland was built up by the use of indentured Asiatic and



Photograph by Spurling and Son

BAM BLUFF: NORTH HIGHLANDS, TASMANIA

Tasmania is blessed with water and escapes the fear of drought ever present in other Australian States (see page 537). The peaks and ridges which everywhere break the surface of the island are rich with minerals. And her people have such abounding faith in the future of Tasmania that they believe she will one day bear to the rest of Australia the relation that England bears to Continental Europe.

PICKING COFFEE: MACKAY, NORTH QUEENSLAND

One usually thinks of Australia as being situated in a latitude as cool as that of our country, and yet three-fourths of its territory lies nearer the Equator than the sugar-cane lands of Louisiana

Photograph by H. E. Gregory

A CHARACTERISTIC "LAKE"—THE BED OF LAKE HART

Kanaka labor. Opposition to the color of the laborers, and more especially to the wage received, led the people of the temperate part of southern Queensland, outside the sugar belt, to object to the employment of non-Europeans, and the political friction engendered led to serious talk of secession. With the formation of the Commonwealth the demand for the elimination of competition with colored races under the guise of the "White Australia" policy was irresistible and the sugar-planters were deprived of their efficient labor and their profits.

The profits were restored by a bounty granted on condition that white labor be employed and that wages and hours be "fair and reasonable." Bernhard H. Wise states that "for the first five years the cost of this experiment was about $4,900,000." While the tonnage of sugar produced has fluctuated, the acreage of the Commonwealth has remained practically the same since 1902, and the number of persons engaged in the sugar industry has decreased steadily from 46,000 in 1907 to 28,000 in 1912.

The history of cotton, rice, and coffee, for which the climate of Australia appears to be eminently suitable, is similar to that of sugar. In spite of liberal bounties, their production has decreased.

THE DESERT

The Central Desert is the Australians' family skeleton. There is not much said about it at home and the visitor rarely sees it; but it is there, a stern reality, which stands in the way of national development. Other continents have deserts, too; the Sahara is larger and our Mohave and the Painted deserts, as well as large areas in Utah and Nevada, are as barren as the region about Lake Torrens.

It is its enormous area in proportion to the size of the continent which gives the Australian desert its commanding position. More than half of the entire continent receives less than 15 inches of rain per year, and the area receiving less than 10 inches is 1,077,245 square miles—more than one-third of the continent, or more than all the United States east of

MOUNT FEATHER TOP, VICTORIA, IN EARLY SPRING

Snow-capped peaks are rare in Australia, and this view of the high Alps was first seen by the young explorer, Hamilton Hume, who in the early years of the nineteenth century won his way from Sydney across country to Port Philip, where Melbourne now stands. "There was Kosciusko to the southeast, and Bogong, Feather Top, and the Cobbler raising their giant hoary heads in front, and you may be sure the explorers could scarce prepare their breakfast for gazing at the strange scene."

the Mississippi. One station reports eight inches in seven years; another six inches in ten years. In the center of the desert the annual precipitation is less than five inches, and over large areas rain may not fall for a period of several years (see map, page 588).

Large areas are so flat that no feature in sight rises above the level of the eye except the ghost-like ridges suggested by the ever-present mirage, and the portion known as the Nullarbor plain, having dimensions, roughly, 450 miles by 200 miles, is one of the most even land surfaces in the world. Railroad levels across this plain reveal a gradual slope from 329 feet to 605 feet in a distance of 450 miles—an imperceptible rise of about seven inches to a mile and a difference in elevation of any two points 20 miles apart of less than 40 feet (see map, pp. 480-481).

In constructing the Commonwealth railway (from Perth, Western Australia, to Port Augusta, South Australia) there are no obstructions to avoid, no bridges to build, and practically no grading to be done, and for 430 miles in a single stretch the line will be without curves.

A DESOLATE REGION

The Australian desert is not a mythical affair like the "Great American Desert," but is a singularly inhospitable waste, which may be entered only in favorable seasons and by special means of transport. Excluding the miners of the Kalgoorlie region, the population on 800,000 square miles of this area, including ranches and villages along the railways, is estimated by the Meteorological Bureau at "probably not a thousand white folk."

Photograph by C. P. Scott

GOVERNMENT CAMEL TRAIN IN THE DESERT NORTH OF ADELAIDE

The Great Desert of Australia divides the continent into two parts, isolating the people of West Australia as completely as if they were on another island. Camels are now generally used for transportation in this region.

CAPRICIOUS RAINS

Large areas of the desert are unknown, but the wide-spaced tracks of explorers are sufficient in number to reveal its character. The reports of the most recent expedition coincide with those undertaken a half century ago: "We have demonstrated the uselessness of any persons (pastoralists or miners) wasting their time and money in further investigations of that desolate region" (Carnegie).

The annual average rainfall is not only insufficient, but is distributed from year to year and throughout the year in capricious fashion. All the rain of a year may fall in a few hours, or several years may pass without rain enough to wet the ground.

Evaporation on the desert's edge, where tested by measurements of loss in tanks, in New South Wales and at Coolgardie, Western Australia, is at the rate of 85 inches per annum—about that of the lower Colorado Valley. At Laverton it is 146 inches, or more than 12 feet—15 times as much as the rainfall.

Travel through the desert consists essentially in getting from one water-hole to another, a task at which the native excels the European. The aboriginal knows the location and yield of every water-hole within the limits of his hunting ground, and is free to move with the rains. When soaks and gnamma holes fail he digs up mallee roots, from short lengths of which water sufficient for a drink may be obtained. He has also learned that water may be squeezed from the bodies of frogs, which bury themselves in mud during droughts.

CAMELS ARE INTRODUCED

Not until 1862, after many failures, was the desert crossed by horses, and then along the line which has proven to be the only feasible one. Compared with other routes this first transcontinental traverse by Stuart is well watered, and has determined the location of the Adelaide-Port Darwin telegraph line, and of a proposed railway (see map, pages 480-481).

From the termini of railways in Queensland and New South Wales, 2,000 miles westward to the Indian Ocean, camels are the burden-carriers across the waterless steppes. Settlements of Afghans with their camels are familiar sights at mining camps and stations along the railways. They carry wool to market and return with needed supplies. Driven in harness, or saddled, they bear the settler and the mails from oasis to oasis, and take the missionary, physician, and engineer to their work. They are used to haul materials for construction, to bring in fuel, to plow, and to distribute water along routes of travel. The water-supply branch of the West Australia government has 350 camels in use, and 300 are taking part in the construction of the Port Augusta-Kalgoorlie railway (p. 554).

The camel of Australia is not a beautiful or an affectionate beast, but he will browse on desert shrubs and carry a load three or four times that of a good horse 20 miles a day without apparent fatigue. When deprived of water for more than five or six days, his efficiency decreases, but he is capable of work for much longer periods.

On Carnegie's expedition the camels were without water for thirteen and one-half days. On a geological expedition north of Eucla, camels were at one time twelve days without water in an average temperature of 100°. On the Jones Survey across and beyond the Nullarbor plains, camels traveled 340 miles over rock and sand, in fifteen days, without water, and waterless stretches exceeding 600 miles have been covered.

It is no simple matter to fill a camel with water. His ordinary drink is seven to eight gallons; when thirsty, twenty gallons; but after being deprived of water for several days, forty gallons is scarcely enough. His demands, therefore, make great inroads on small water-holes. In desert mining camps, where water is scarce, the drink for a camel may cost $2 or $3, and the owner of "Misery," coming in from a long trip, is said to have paid $14 to quench the thirst of his mount.

At the end of the railway, in South Australia, is Oodnadatta, the most remote village on the continent. Three stores, a hotel, a missionary hospital, an Afghan village, and buildings of the government railway are its principal features. Water is obtained from an artesian well which

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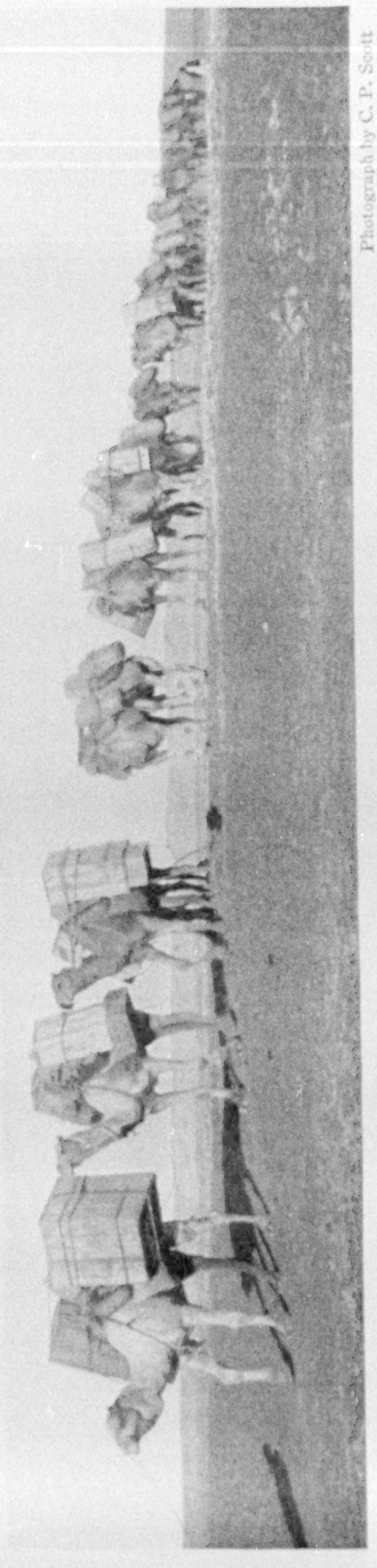


Photograph by C. P. Scott

A CAMEL TRAIN IN THE CENTRAL AUSTRALIAN DESERT

yields 270,000 gallons of somewhat salty, hot water a day; for drinking, the rain-water caught on iron roofs is used. Food of all kinds is brought to Oodnadatta by train; the town exists for the purposes of forwarding supplies by strings of camels to far-away ranches and for shipping produce of scattered stations and transferring cattle and sheep in times of drought.

BUILDING A DESERT RAILWAY

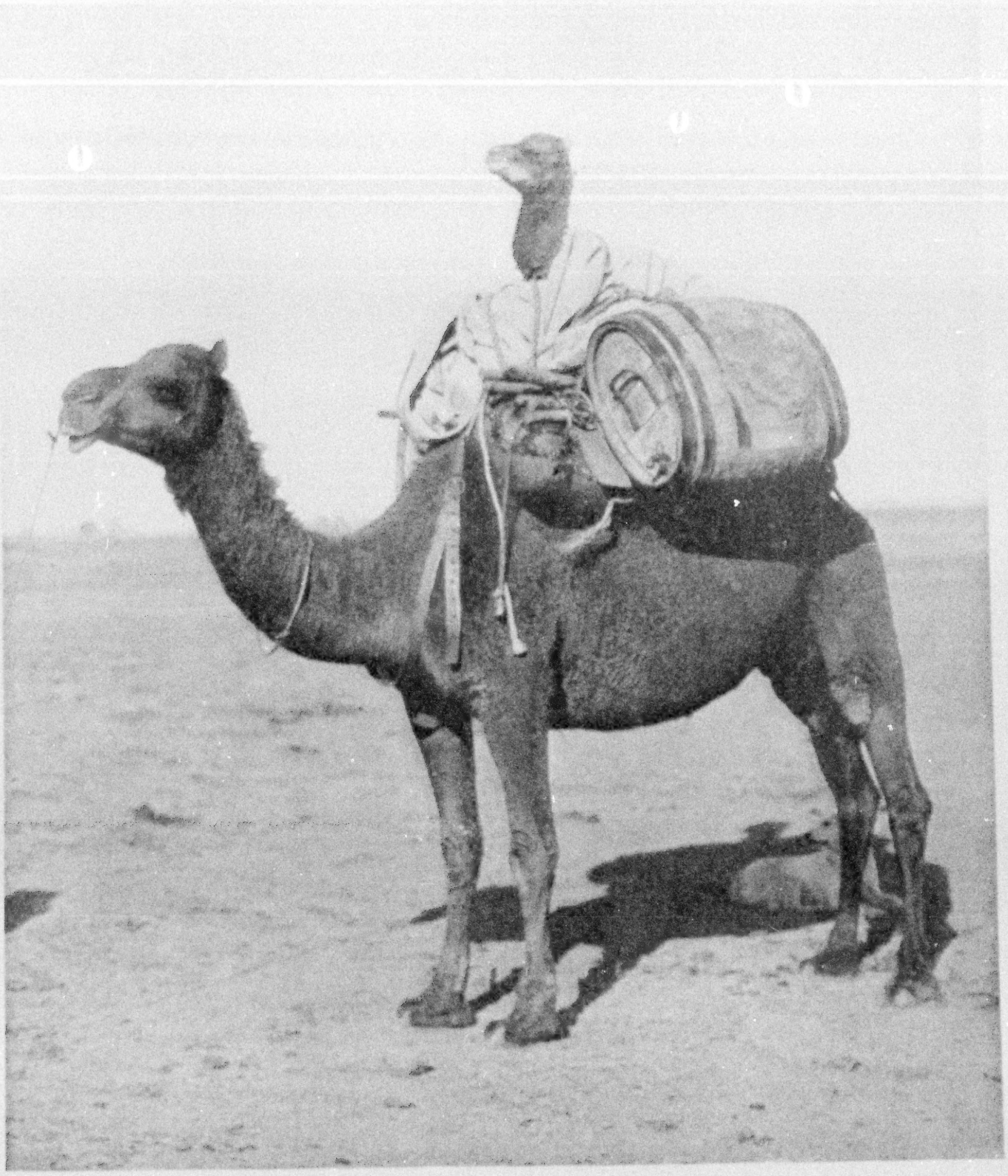
A ride on one of the tiny trains which run twice monthly to Oodnadatta, equipped with extra tank cars and water bags for passengers, is dreary enough if one is looking for grass and water and trees. To me the views of sand-dunes and gibber-plains, of the sheet of Lake Eyre, of mirage and dust-storms and distant mesas, constituted features of a fascinating journey.

The Great Desert of Australia divides the continent into two parts, isolating the people of West Australia as completely as if they were on another island. There is no land communication between this State and its nearest neighbor except by telegraph, and the boat journey from Sydney to Perth requires more time than from Sydney to New Zealand and only a little less than from Perth to India.

The Commonwealth has now undertaken the task of providing an overland route from the Pacific to the Indian Ocean. The ordinary engineering problems are so small that the line was laid out by compass; there are no tunnels, deep cuts, or steep grades, and few culverts and bridges are required. Sand-dunes are the greatest obstruction, and the amount of excavation in crossing a belt of dunes 20 miles wide is more than half that required for the whole 1,063 miles of new track (see map, pages 480-481).

The remarkable feature of the railway is its location in a region uninhabited even by aborigines, and where the real task of the engineer is to provide water, grading and track-laying being incidental.

The preliminary surveys for the railway were conducted by camel parties; then well-boring outfits were dragged by teams of 14 or 16 camels over the route or from ports on the coast. Workmen supplied with water by camel-trains were set at work constructing catchment basins



Photograph by C. P. Scott

"GETTING ON" IN THE WORLD

On the long marches through the Australian deserts the wobbly legs of the baby camels sometimes fail them, and they are then given a free ride

and digging shallow wells, but the chief reliance is upon water in tank cars hauled hundreds of miles.

At the eastern end of the line water must be found for 200 horses, 300 camels, and 1,200 workmen with their families, besides that needed for eight locomotives, each one of which uses about 60 gallons per mile, or 60,000 gallons for a 1,000-mile run. Water at the head of rails, carried 300 miles in tank cars and 30 miles by camel, costs $39 a thousand gallons; at one point the cost is $2 a gallon. At the western end of the line, water is taken from pipe 350 miles long, then hauled 220 miles at a cost of $8.40 a thousand gallons for each 100 miles.

PANAMA CANAL IDEAS APPLIED IN THE AUSTRALIAN DESERT

It was interesting to watch the railroad building. The construction camps

Photograph by H. E. Gregory

A BUBBLING SPRING OF SALT WATER: CENTRAL AUSTRALIAN DESERT

near the end of the line have buildings like those on the Panama Canal, with well-equipped hospitals, dining-rooms, and offices. The "tea and sugar train" is continually bringing supplies from the storehouse at Port Augusta, for the daily menu of the highly paid workman includes not only freshly baked bread and fresh meat, but also fresh vegetables and fresh fruit.

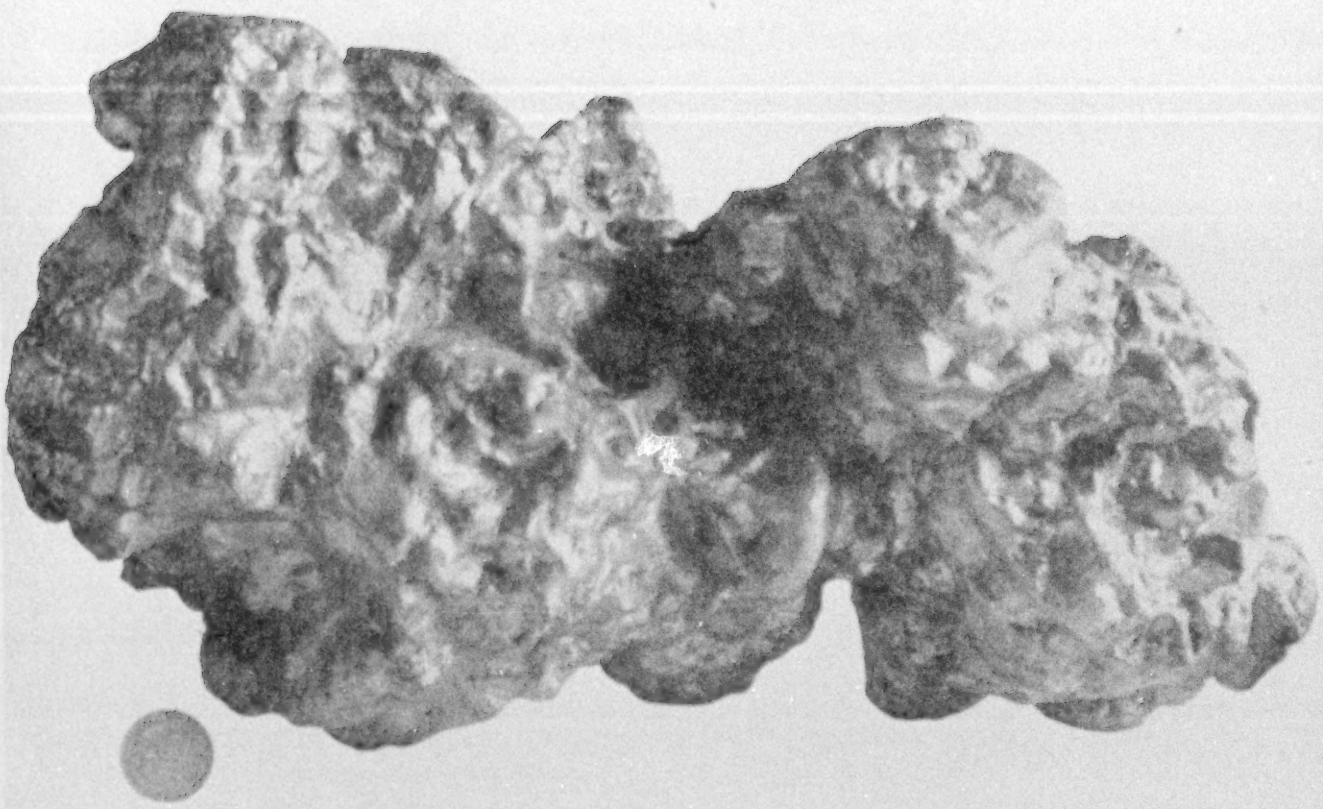
At the end of the constructed track the home-like train is left and a string of thirteen camels carries us on into the desert towards Ooldea and the Nullarbor plains. At Ooldea soak there is water among the sand-dunes and we go into camp, nearly 200 miles from the nearest settlement. Over the 630 miles separating Ooldea from Kalgoorlie travel by motor is feasible after supplies of water and gasoline have been laid down at stated points by camels. There is no road, but the Nullarbor plains are remarkably level and their surface is practically free of sands.

The expected returns from traffic on the Australian transcontinental line are an insignificant fraction of the cost of building and upkeep, but its political and strategic values are immense. It shortens the distance from London to Melbourne or Sydney by nearly a week, and likewise decreases the time between West Australia and New Zealand or America. It brings the western half of the continent in touch with the eastern by converting a strenuous two months' overland journey from Adelaide to Perth into a comfortable ride of two days.

THE ROMANCE OF GOLD AND SILVER

When word reached Sydney early in 1849 that an Australian engineer had found gold in the streams of the Sierra Nevada, the boats to San Francisco were crowded with Australians. One of these amateur miners, Edward Hargraves, was so impressed with the similarity between the gold-bearing rock of California and the rocks along the Macquarie, that he hurried back to Australia and had the satisfaction of startling the peaceful colonies by the discovery of gold in New South Wales in February, 1851. One year later 105,000 men were encamped at three gold centers: Ballarat, 40,000; Bendigo, 40,000; Castlemaine, 25,000.

In 1850 Victoria had a population of 76,000, chiefly stockmen and farmers; by 1855 there were 364,000 inhabitants, three-fourths of them men. During this period Melbourne rose from a town to hold for a time the position of the foremost city in the Southern Hemisphere;



Photograph by C. R. Martin

AN AUSTRALIAN GOLD NUGGET COMPARED TO A $20 GOLD PIECE

The nugget weighed 2,159 ounces when found at Ballarat, Victoria, on June 15, 1858, and was sold for $50,000

parks were laid out; the University, Public Library, and Museum established; the first Australian railway built, and plans for the future knew no bounds.

Reports of panning $100 to $200 per day and of finding nuggets worth thousands of dollars each upset even the most sober-minded. "Farms, shops, ships were alike deserted, not only by men on them, but by their owners and masters. It was shearing time, but there were no shearers; it seemed like that at harvest time there would be no reapers." Even government officers and policemen deserted, and order was kept and offices manned by soldiers brought from Tasmania and from England.

The workings at Ballarat and Bendigo justified the excitement. For the first ten years, 1852-1861, the output was valued at $486,000,000. From the Victoria field have come 412 gold nuggets, each weighing over 100 ounces, 52 over 500 ounces, and 12 over 1,000 ounces. The weight of the "Welcome" was 2,217 ounces and of the "Welcome Stranger," found an inch below the surface, 2,520 ounces, worth $50,000.

Queensland's turn came next. One small field after another was developed, until in 1886 the famous Mt. Morgan mine was opened. This wonderful mine, literally a mountain impregnated with gold, began by paying dividends of $2,000,000 a year. In 1889 the stockholders received $5,000,000, and the dividends for the first twenty years amounted to $35,000,000. Although Mt. Morgan continues to produce $2,000,000 in gold a year and is a leading factor in Queensland's annual gold production of $5,000,000 to $10,000,000, it is in reality a copper mine! The gold constitutes the fringe of a mammoth deposit of copper, with reserves estimated at 7,000,000 tons. In several respects it is the most remarkable mine in the world and ranks next to Broken Hill as a dividend-payer.

Tasmania had her mining excitement with the discovery of tin at Mount Bischoff (1871), followed by the finding of deposits of gold, copper, and silver.

XUM

AN OSTRICH CHORUS: PORT AUGUSTA, SOUTH AUSTRALIA

"The young birds are said to be remarkably silent, but the old birds, and especially the males, have a hoarse, mournful cry, which is likened by some to the roaring of a lion and by others to the lowing of an ox."—KNOWLTON

These discoveries had, however, little effect in increasing the population or changing its character. Although this State ranks first in the production of tin, second in silver and lead, and produces over 6,000 tons of copper a year, "it remains what it always was—a group of gardens, farms, wood-lots, and orchards" in the midst of delightful scenery. It is the White Mountain region for Australia.

FABULOUS RETURNS

Broken Hill, in New South Wales, is perhaps the most famous mining district in Australia, noted alike for containing the largest lead-silver mine in the world and for its endless labor troubles. These two claims to fame are closely related, for the richness of the ore bodies and size of the dividends have incited the miners to "get their share." The crude ore runs 16 per cent of lead and zinc and 11 ounces of silver to the ton. From a lode 10 to 300 feet wide and 2 miles long ore to the value of $383,000,000 has been extracted. One of seven shares of the original proprietary syndicate, valued at $500, afterward was quoted at $11,000,000!

The Broken Hill mines have changed the map of Australia. They support in the desert a city of 33,000 people, a privately owned railway 250 miles in length leading to a port in an adjoining State, and at the end of the railroad the smelter town of Port Pirie, with a population of 15,000.

West Australia was the last of the States to feel the push of mining discoveries, but the impulse came with unusual force. The growth, development, prosperity, legislation, and social character of this State are but the reflections of its gold mines. In 1880 the total population of an area nearly one-third as large as the United States was 29,000, distributed along the coast and engaged in agricultural and pastoral pursuits. But the sensational discoveries at Coolgardie (1892), followed by the almost unparalleled finds a few miles farther on, at Kalgoorlie, within three years doubled the population of the State, and during the twenty years since Hannan made his memorable discovery a population of 48,000 had become 320,000 (see map, pages 480-481).

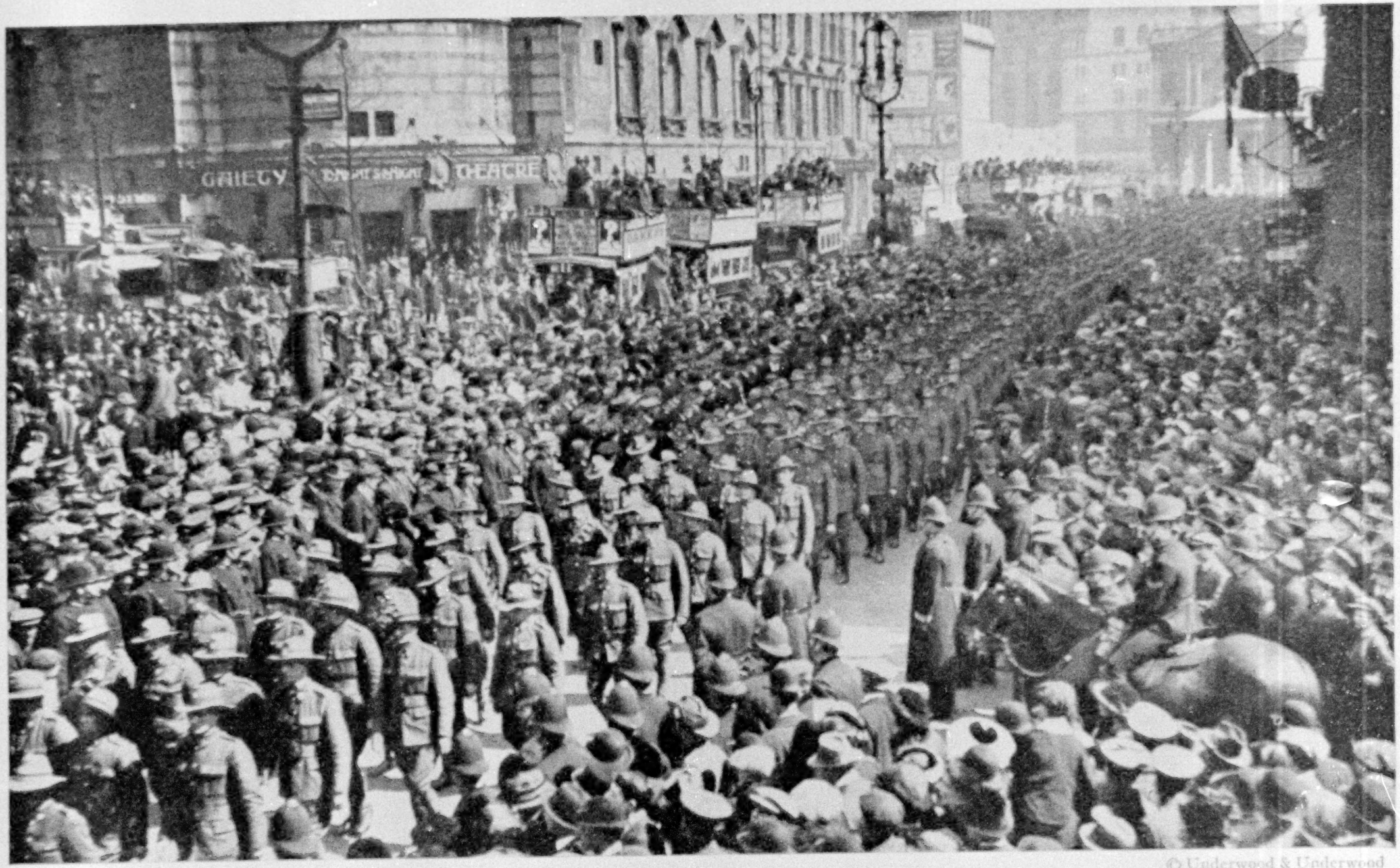
The mines of the "Golden State" have justified their early promise—they are fabulously rich. Within a few feet of the surface gold in flakes, grains, and nuggets weighing tens of ounces was ready for the finder. In one excavation 8 feet by 5 feet by 4 feet $90,000 was taken, and by the year 1900 seventy tons of gold had been gathered at Kalgoorlie.

West Australia is the Nevada of the southern continent; Kalgoorlie its Comstock Lode.

The sensational yields of the early days in Queensland, Victoria, and West Australia were largely from surface workings made by pick and shovel; but now ore is mined at Ballarat to depths of exceeding 2,500 feet. At Bendigo thirteen shafts are over 3,000 feet in depth, and the Victoria Reef Quartz Mine reaches a depth of 4,614 feet—probably the deepest gold mine in the world. In West Australia real prosperity began with deeper mining and has continued with slight abatement to the present day.

RAILROAD MAP (SEE ALSO PAGES 480-481)

Although the railroads of Australia are largely State owned, there can be very few through routes, for each State has its own gauge track (see text, page 564). It is not likely that motor trucks will ever play a large part in the Australian Desert. The amount of material transported to the back country will always be small, and on account of the scarcity of water and the very high price of gasoline (there is no fuel oil of any sort in Australia), it will be unprofitable to use trucks for transportation. Where a large amount of material is to be handled, as from a mine, an amount too large for camels and too small to justify the construction of a railway, motor trucks will eventually, I believe, find a place. At present automobiles are used in the more thickly settled parts of the country; horses, however, are the chief transportation agents in the humid regions and camels in the arid.



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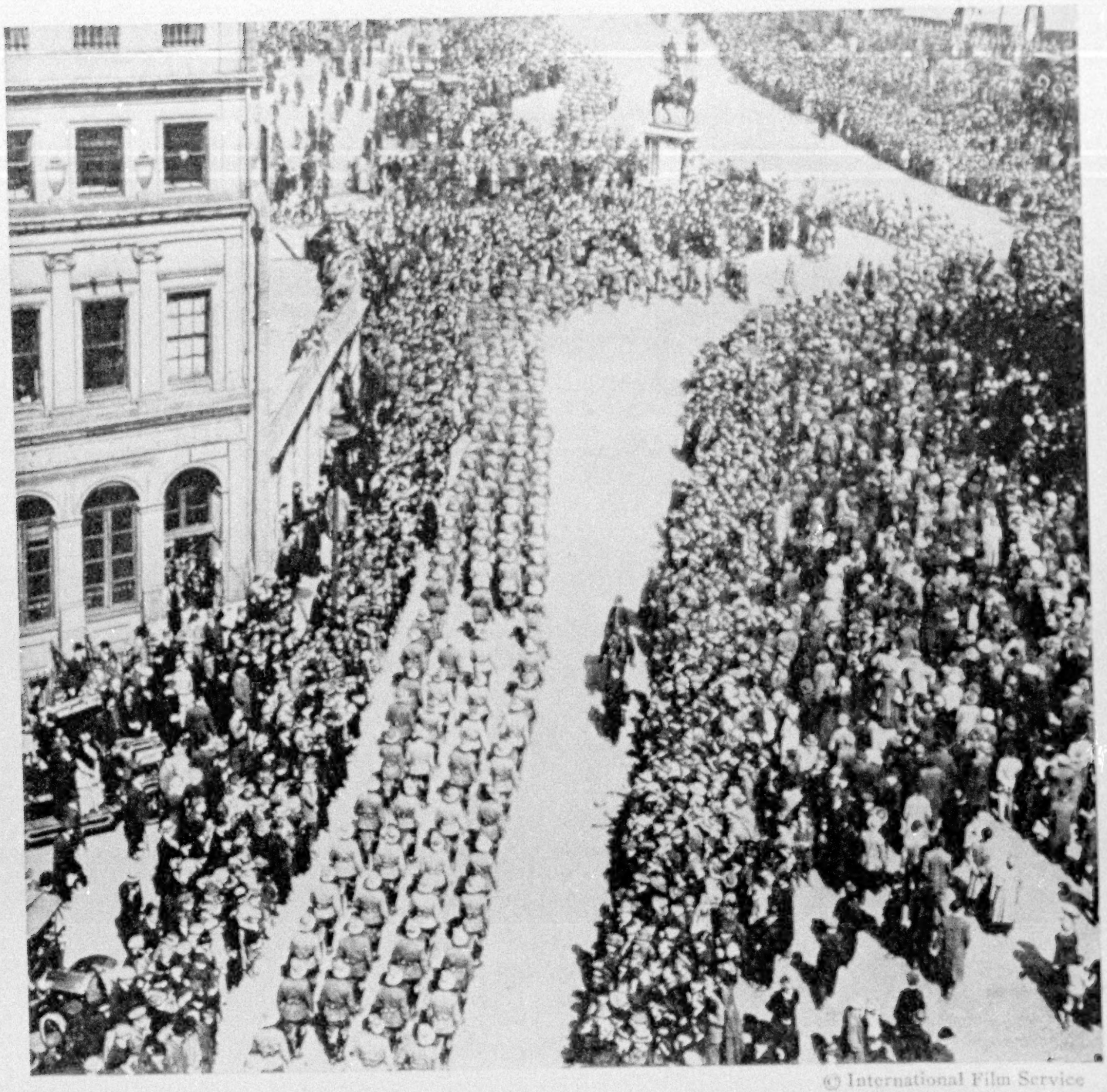
THE AUSTRALIAN-NEW ZEALAND TROOPS MARCHING THROUGH THE STRAND TO WESTMINSTER ABBEY, LONDON

London has had frequent object lessons in the patriotic devotion of the people of the overseas dominions, but none more stirring than the marching of this division, which had come 11,000 miles to help the mother country



© International Film Service

A GREAT DEMONSTRATION AS AUSTRALIAN AND NEW ZEALAND TROOPS MARCH THROUGH THE STREETS OF LONDON

Could one read the inmost thought of every individual in that multitude of watchers, what a flood of sorrow and woe the reading might reveal! For London homes that have not sent fathers, husbands, brothers, or sons to make the supreme sacrifice for the Empire are rare.

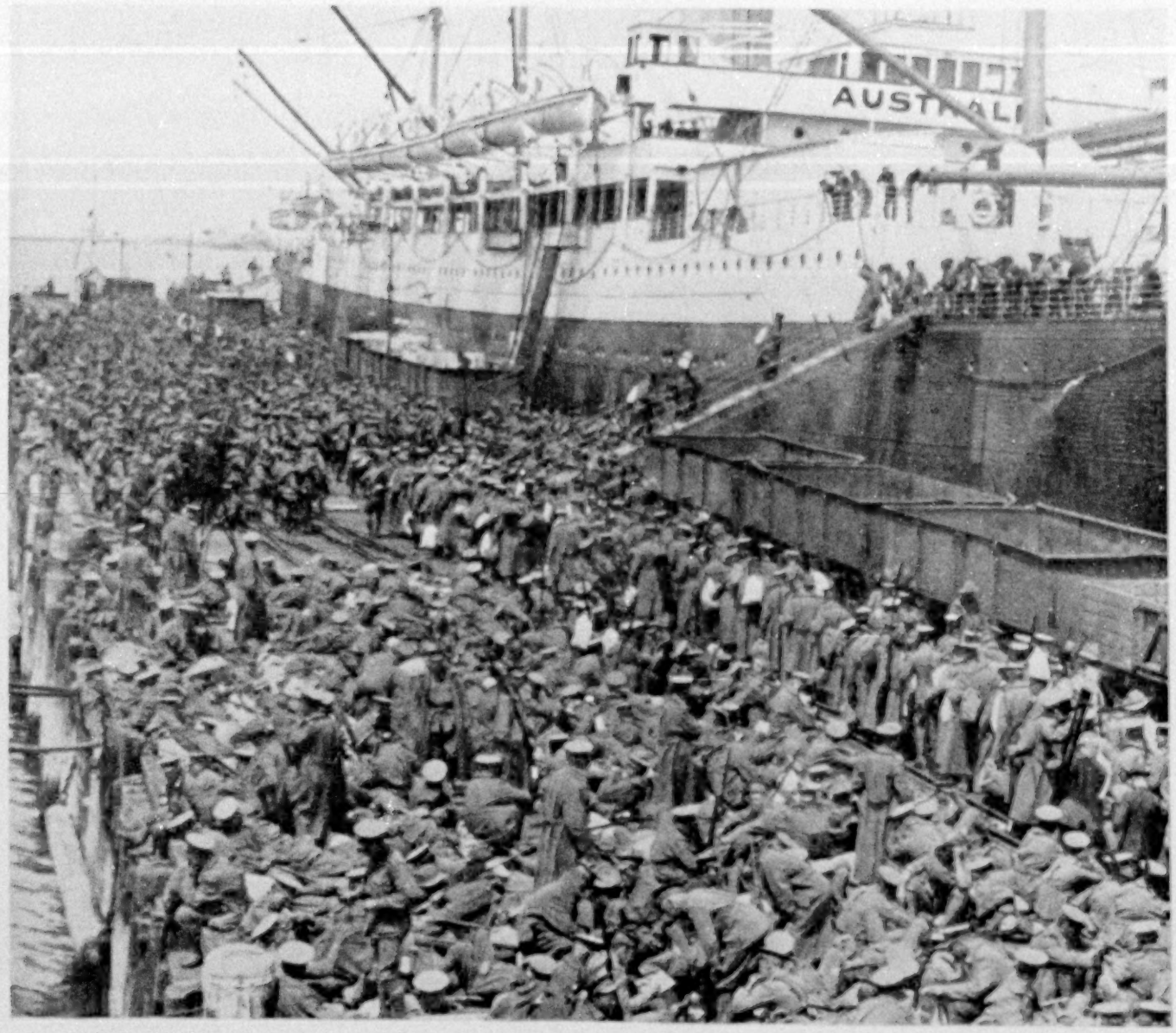
The Broken Hill mines supply the bulk of the lead, silver, and zinc annually exported from Australia, the zinc until 1914 going chiefly to Germany for the manufacture of munitions. It is not at all unlikely that volunteers from New South Wales have met their death from shrapnel made from zinc and copper which they had previously mined.

For a few years following 1900 Australia ranked first among the world's producers of gold, but with the development of the Alaskan fields and the unparalleled production of the Transvaal she has fallen to third place.

A WATER MAIN 350 MILES LONG

The gold mining camps of Western Australia are in an unmitigated desert—hot and dry. In the early days of the gold fields water was scarcer than gold, and the hardships endured by the early miners and the disastrous endings of some of the prospecting expeditions make a story one would like to forget.

With the discovery of rich gold mines



Photograph by George Bell

AUSTRALIAN TROOPS EMBARKING FOR FRANCE

So long as red blood continues to run in human veins, so long will men continue to pledge their lives, their fortunes, and their sacred honor to the maintenance of what they believe to be their country's rights.

centering at Kalgoorlie, a serious problem was presented. The region is without streams and fresh-water lakes, and wells yield only salt water. The nearest supply in quantity is 300 miles distant. By converting the salt water into fresh with condensers, by utilizing the few soaks, by storing some of the scant rainfall, by hauling water with camels and later by rail, mining operations could be carried on at great expense. When dry blowing of alluvial gold had exhausted the rich surface deposits and the equally rich ledge was encountered, the future profits of the field depended not only upon the amount of the mineral—gold—but also upon the mineral—water.

To meet this situation a most ambitious scheme was undertaken—the construction of a pipe-line from a point near the coast over desert range and valley to supply an artificial reservoir with 5,000,000 gallons a day. The length of the 33-inch steel main pipe is 351 miles—115 miles longer than the Los Angeles aqueduct—and the water is lifted by a series of pumps to a height of 1,290 feet. The cost was great, $5,000,000 for the manufacture of the pipe alone.

The water is sold by the government at an average rate of 75 cents per thousand gallons—a price which seems large to American consumers—but it replaces the wholly inadequate supply of poor water bought at the rate of $8.00 to $12.00 per thousand gallons. Without the Goldfields' pipe line the richest mining fields of Australia with the cities of Coolgardie, Kalgoorlie, and Boulder would revert to their original state—a forbidding desert.

The various State governments advance money to prospectors and to mining companies, drill for metals, coal and oil, erect and operate crushers, testing plants, construct roads, build dams and reservoirs, buy and sell machinery. In Victoria 26 batteries are run at government expense; in West Australia, 40. New South Wales has "grub-staked" prospectors to the sum of over $2,000,000.

The mining towns of Australia emphasize the Australians' love of home and pleasant surroundings. The mushroom city of Kalgoorlie in the land of "sun, sand, sin, sorrow and sore eyes," where water is obtained from the end of a 350-mile pipe, has its gardens and lawns and shade trees.

To an American, whose idea of a mining town is based on visits to Butte or Virginia City, a day in Ballarat, Victoria, is filled with surprises. He walks through clean streets, lined with attractive buildings and adorned with statues, leading to parks and public gardens and on to a beautiful lake. Ballarat has demonstrated the fact that mining town is not synonymous with ugliness and lack of public spirit.

THE IMMIGRATION AUSTRALIA SEEKS

Australia is disappointed that of the four large areas which offer congenial homes for people of European blood,—namely, Australia, Canada, United States and Argentina—Australia alone is passed by, while the other three favored regions are receiving Europeans by hundreds of thousands. She sees the United States receiving in one year (1913) 1,197,892 people from abroad, more than the entire net immigration to Australia for the past fifty-three years, and in another year (1910) enrolling four times as many people born in the United Kingdom as were living in Australia.

The stream of immigrants has been not only small but remarkably fluctuating for individual States and for the Commonwealth, and at times has ceased altogether. For the five years, 1896-1900, the net immigration was only 2,487, and the five years following showed a net loss of 16,793. Since that date net immigration has again increased, and in 1913 reached 55,000.

In countries of large population the rate of immigration is a matter of small account, but a continent of nearly 3,000,000 square miles, with vast undeveloped natural resources, must have people if the financial burdens incident to development are not to be crushing. On June 30, 1914, before the beginning of the European war, the debts of the six States reached the enormous total of $1,550,000,000, or $245 per capita, in addition to a Commonwealth public debt of $93,000,000. These startling totals for a dominion with a population less than New York City, while not directly comparable with the debts of most other countries because much of the money is invested in public utilities, are disproportionate to the population and demand interest charges not easily met.

ENCOURAGING NEWCOMERS

Viewed in the abstract, the advantages offered by Australia to a foreigner are exceptionally good. The climate is healthful, unoccupied land is abundant, and social life is unusually pleasant. But in spite of a vigorous campaign, immigrants do not flock to the Commonwealth. Perhaps, because the land, though practically free, is not really so in the sense of the homesteads in the United States, to which absolute title is obtained by residence; and the available land also requires more preparation than the prairies of Canada before return in crop is possible, while the rainfall is less reliable.

Or it may be that the door for the immigrant is not wide open.

The type of immigrant desired is indicated by the classes to which the States and Commonwealth provide "assisted passages." The South Australian list is typical: "*a.* Agricultural or other rural workers. *b.* Domestic helpers. *c.* Persons whose introduction to the State will not, in the opinion of the minister, cause congestion in the State in any occupation or trade." Even with agricultural laborers "care is taken to limit the supply to the demand."

THOSE WHO ARE NOT INVITED

Agriculturalists who will take up small tracts of new land, and domestic servants, are more than welcome, and to these

money aid is extended, but mechanics and miners, factory operatives and manual laborers, and professional men, are not received with open arms, and may find difficulty in becoming established. The carpenter calls for immigrants, but not for more carpenters; the mason sees no need for immigrants skilled in stone or brick work, and the pick-and-shovel man thinks there are enough of his guild already in the country.

If 200,000 European immigrants, such as land in New York, should arrive at Sydney some year, planning to distribute themselves among the skilled and unskilled trades, to open small shops, and start market gardens, a special session of Parliament might have to be called to deal with the disaster! And, when it is remembered that Europeans desiring to emigrate are in crowded industrial, rather than agricultural communities, and know little and care less for country life of uncertain outcome, there is no occasion for surprise that a call to the farm or to domestic service receives feeble response. Even Australians are drifting to the cities (see pages 513 and 527).

THE AUSTRALIAN COMMONWEALTH

As population increased and industries and communications became established, it was found that the interests of the Australian States were not identical—in fact, were in many respects antagonistic—a condition readily understood when the sites of the colonies are noted (see map, pages 480-481).

It is as if Massachusetts, Pennsylvania, Georgia, Arizona, and Oregon were small contemporaneous colonies, each striving to work out its local problems. It appeared to be the duty of each State to enlarge its power, regardless of the welfare of its neighbor or of the continent as a whole. Even within the States differences developed, and secession was proposed by the tropical portion of Queensland and the mining sections of West Australia.

New South Wales was a free-trade State: the others favored protection: but each State had its own tariff laws. Each State also had its own land laws and rules governing copyright, and its own system of defense and of quarantine. Each State developed its railways without regard to interstate traffic, with a gauge and type of rolling stock which suited its needs.

STATE RATE WARS

The struggle was the most intense between the two most populous colonies, New South Wales and Victoria—in reality between the cities of Sydney and Melbourne. Victoria built railroads to and along the border of New South Wales and agreed to carry wool and produce of New South Wales origin to Melbourne at nominal cost. New South Wales also made ridiculously low rates for freight from Victoria points to Sydney, and Queensland and South Australia were likewise industriously engaged in cutting their neighbors' throats at public expense.

The submergence of national to local interests and the desire to build cheaply and rapidly have resulted in a condition of railway gauges which makes interstate traffic impossible without reloading. New South Wales has a gauge of 4 feet 8½ inches; Victoria, 5 feet 3 inches; Queensland and West Australia, 3 feet 6 inches; South Australia, 5 feet 3 inches, 4 feet 8½ inches, and 3 feet 6 inches. The gauge of the new transcontinental railway is 4 feet 8½ inches. A passenger landing at Brisbane, destined for Perth, must change to a different type of car five times, and even between the two largest cities, Sydney and Melbourne (582 miles)—the distance from Omaha to Denver—no through cars can be operated.

With such jealousies and antagonisms it is not surprising that fifty years of fruitless effort should have preceded federation, or that the constitution finally adopted should give large play to the doctrine of State's rights. The model chosen was, naturally, the Constitution of the United States, in which the States retain such powers as are not specifically delegated to the Federal authorities. The Canadian scheme, in which Federal Parliament is supreme over the provinces, and the South African Union, which is a union only in name, were unacceptable.

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ANZAC TROOPS OFF TO THE FIRING LINE IN FRANCE

Their hearty response to the welcome of the French villagers is full of jollity, even though a thousand Balaklavas rolled into one may be their morrow's lot

XUM

STATE'S RIGHTS IN AUSTRALIA

But the Commonwealth government of Australia has a much narrower scope than the Federal Government of the United States. Its chief function is to organize defense, regulate overseas and interstate commerce, establish and collect customs duties (of which three-fourths must be returned to the States), coin money, and operate post-offices, telephones, and telegraphs. The States retain all forms of taxation, control the public lands and rivers, and operate railways. The meteorological service is a Commonwealth department, but geological surveys, mine investigations, irrigation, etc., are State functions. Interstate commissions replace Federal bureaus in dealing with many internal problems.

There is even a greater difference between Australia and America in the scope of governmental action. To an Australian, the Federal, State, and city governments are not organizations designed primarily to preserve order and protect property and maintain civic rights; they exist in order to do the people's business, and have no apparent limitations.

Action by Parliament is the cure-all for public and private ills. The State operates railroads, street cars, ferryboats, water works, electric light plants; fixes prices and hours of labor and wages; makes clothes and machinery; sells fish, meat, dairy produce; exports wines; runs warehouses; supplies seed wheat; builds fences and roads; digs wells; provides insurance; pays hospital bills; loans money to individuals; buys and sells land; runs mining plants.

A GENUINE AUTONOMY MAINTAINED

Not only have the States refused to be submerged in the Commonwealth, but the Commonwealth maintains its independence of the British Government to an unusual degree. Politically and economically, Australia and England are far apart. Appeals to the Privy Council at London are strictly limited, and tariff regulations restricting the trade with the mother country are in force. To the Australian the Commonwealth is a growing nation, which owes its origin, but not its development, to England.

The leaders recognize the fact, obvious to the foreigner, that Australia has its own problems, in the solution of which little is gained by following traditions and customs applicable to a thickly settled manufacturing country with well-defined social strata.

If one were to take at their face value a selection of caricatures and humorous writings, as well as editorials, letters, and pamphlets, printed in Australia during the last quarter of the nineteenth century, he might well reach the conclusion, apparently arrived at by certain of England's enemies, that self-centered and ambitious Australia was little removed from an unfriendly Australia. The fallacy of confusing independence with disloyalty is amply demonstrated by the Boer War and by the Great War.

When by Germany's action Great Britain was placed in a perilous position, the response of Australia was vigorous and immediate. A nation of peace-loving people, intent on their own affairs, was transformed into a group of warring Britons, as it were, over night. It appeared as if the very weakness of the political tie strengthened the bond of allegiance.

PROMPT TO ANSWER THE EMPIRE'S CALL

Within two months after war was declared the little Australian fleet of five cruisers, three torpedo-boat destroyers, and three light gunboats, built and manned at the nation's expense, had occupied the German Pacific islands—Samoa, Marshall, Carolines, Pelew, Ladrones, New Guinea, New Britain—broken up the German wireless system, captured eleven enemy's vessels, forced twenty-five others to intern, and prevented the destruction of a single British ship in Australian waters. In the third month of the war the *Emden*, lying in wait for Australian transports, met its fate before the guns of the cruiser *Sydney*. Later on the watchful Australian fleet played its part in driving von Spree's squadron from the Pacific into the trap set by Admiral Sturdee at the Falkland Islands.

The response of the military forces was likewise quick and effective. Although fighting at a distance involved unusual effort and expense, the task was

Photograph by George Bell

WELCOME HOME: THE RETURN OF THE HOSPITAL SHIP

In all the history of war no colonials ever rendered braver or better service to a mother country than [illegible] which Australians and New Zealanders have rendered to Great Britain in her present struggle. From Gallipoli to Arras and the Somme they have covered themselves with glory. And the devotion of the folk back home is worthy of the courage of the men at the front.

Photograph from Paul Thompson

A WARM WELCOME FOR A YOUTHFUL VETERAN

The Australian people are naturally proud of their heroes on their return from the firing line. This photograph shows a wounded Anzac being attended by auxiliary nurses on arrival at the base hospital at Randwick, Sydney.

loyally assumed. Universal military service was inaugurated for the first time by an English-speaking community. Factories were turned over to the government, seventy steamers were requisitioned and rebuilt for transport service, war loans were offered and quickly accepted.

On November 1, 1914, 20,000 men, the entire Australian army at the declaration of war, left Australia for Egypt; at the end of the first year of the conflict 76,000 were in the field, and by July, 1916, "nearly 300,000 volunteers had crossed the seas." The creation, equipment, and supplying of this army, involving enormous cost and personal sacrifice, constitutes a thrilling chapter in the history of loyalty.

Building for Power—

That's what you're doing when you eat good soup.

Not merely flesh and muscle, but nerve-power and energy are what count in the world today. And good soup—as all authorities agree—is rich in the nutritive properties which build up vitality and force.

You find not only enjoyment and satisfaction, but power-building nourishment in

Campbell's Tomato Soup

Its fragrant aroma, inviting color, and exhilarating flavor are founded on Nature's own recipe as put up in the juicy red-ripe tomato.

By means of the exclusive Campbell method we preserve these tempting qualities with all their natural efficacy retained. We blend the pure fresh juice of the tomato with other choice ingredients in a well-balanced delightful and wholesome combination.

Campbell's Tomato Soup is valuable not only as a creator of appetite, but as a food which is assimilated almost completely and transformed, with the least possible tax on digestion, into the elements of active capacity and power.

Do you get the benefit of this nourishing soup as often as you might?

Campbell's Soups

LOOK FOR THE RED-AND-WHITE LABEL

Misses' Fur Coats

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Established 1820

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Operate Immediately! But the Money?

HE had never been sick a day in his life, he boasted, and the next week came an attack of appendicitis. The doctor said, "Operate immediately," and his wife went pale, for there was no money in the bank. But in all his pain, he smiled. "Don't worry, my dear, I have taken out an Ætna Policy. Ætna will pay the doctor or the hospital **and send us an income as long as I am disabled."**

Be wise, too—now, while you are well—

ÆTNA-IZE

If you are in a "Preferred" occupation, and under 51 years of age and pay $60 a year for an Ætna Disability Policy, you will get:

$25 a week up to 52 weeks while you are ill. $25 a week for 100 weeks—nearly two years—if you lose the sight of both eyes by disease, or the use of both hands or feet or one hand and one foot by paralysis. Also payment of hospital charges up to $12.50 per week for ten weeks, or for a surgical operation.

Or you will get $50 a week as long as you are disabled by a railway, steamship or burning building accident. $25 a week if disabled by an ordinary accident. If you are killed in an accident or lose two limbs or both eyes, you will get from $5,000 to $15,000, depending upon the character of the accident and the number of years you have carried the insurance. Half as much for loss of one hand, foot or eye.

Send this coupon and find out about this wonderful policy and all the other Ætna Disability and Accident Policies—one as low as 3c a day protects you in case of accident. Among all these there is one that fits you exactly. **Tomorrow may be too late.** Send the coupon and find out about it—today.

N. G.—12-16

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Occupation .....

Bus. Address .....

ÆTNA LIFE INSURANCE COMPANY
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I have marked the kinds of insurance I wish to know about: Accident ☐, Health ☐, Disability ☐, $250 LifeCertificate ☐. My age is ..... years. I am in good health.

18

ÆTNA LIFE INSURANCE COMPANY

Drawer 1341 HARTFORD, CONN.

The largest company in the world writing Life, Accident, Health and Liability Insurance

Agency opportunities for all Casualty and Bonding lines

An Ætna Agent has a national advertising campaign working for *him* all the time

All Kodak Film is now Speed Film

When we began the manufacture of "Speed" film it was decidedly faster than our regular N. C. emulsion. There were, however, some particulars, such as uniformity and keeping quality, in which it was more difficult to control than the old reliable "N. C." In order to protect our customers against film that might have deteriorated through age, we did not give it as long a dating as was given the N. C. film. We were inclined to make haste slowly.

In the Speed film, we had just what we claimed for it: "*speed*". In the N. C. film, which had a very different emulsion, we had beautiful gradation and absolute reliability. Gradually, during a period of six years, we have increased the speed of our N. C. film without losing one jot of its reliability, its keeping quality or its fineness of gradation.

All Kodak film is now Non-Curling Speed film, both the Autographic, and the "N. C." that is wound in the old way without the autographic feature. Both are the reliable, dependable film—with added *speed*.

Important to Amateurs. Practically all negative emulsions (both plates and films) and Kodak film in particular, have a wide latitude *on the side of over-exposure.* This means, that while your pictures will be unsatisfactory if even a little under-exposed, they can have considerably *more* than the necessary exposure without the slightest harm. The moral is, of course: when in doubt take the choice of erring on the side of over-exposure. Kodak Speed film will help out appreciably by giving better timed negatives than can be obtained with other films when light conditions are poor. On the other hand, the latitude is such that you can expose and should expose, under good light conditions, just the same as you always have with the regular Kodak N. C. film. It isn't intended that you should cut down exposures when using Speed film. It is intended that you shall get better negatives when working under adverse conditions—and you will.

If it isn't Eastman, it isn't Kodak film.

EASTMAN KODAK CO., ROCHESTER, N. Y., *The Kodak City.*

Loyal to the Service

They Uphold Each Other's Hands

The public *must* be served. This is the dominating thought of the entire Bell organization from the president down. Every employe feels the sense of responsibility that this working principle implies. The public must be served—efficiently, uninterruptedly.

In the fulfilment of this policy, the management of the Bell System realizes that every individual employe must give undivided and undistracted effort and interest to his work.

To assure this, every worker receives adequate remuneration, ample protection in case of illness and provision for old age. All these personal matters are cared for so that the employe has the least possible worry regarding his own welfare. His whole-hearted attention can be devoted to serving the public.

While each employe realizes that he is but a single factor, he understands that not only is supreme personal effort expected of him, but also a loyal support to every other telephone worker.

There is something in the telephone organization which imbues every employe with a spirit of loyalty to the public. All feel a direct responsibility for each other because each recognizes that only by mutual endeavor can they render the high standard of service which is expected of them. They uphold each other's hands so that the public may be served.

AMERICAN TELEPHONE AND TELEGRAPH COMPANY

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One Policy *One System* *Universal Service*

"Mention the Geographic—It identifies you."

XUM

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DAIRY FARM
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Thirtieth Season

IT is *economical*—there is little or no waste. It is *good food value*. It is *appetizing* to the most fastidious.

This is our 30th season in the manufacture of Jones Dairy Farm Products. Your grocer will tell you of our prices and times of shipment.

Be sure that it's Jones.

MILO C. JONES
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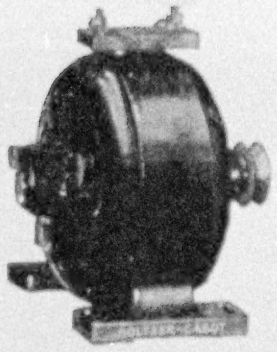
For 25 Years We Have Built

Motors

To Operate Commercial and Domestic Appliances

The fact that they are *Bought in Thousand Lots by Nation-wide Distributors* is their best sales argument. Such men demand motors that are long-lived and entail small maintenance expense. Their customers throw back defective motors and sometimes the appliance too. That's why these appliance manufacturers look to *quality* first in a motor.



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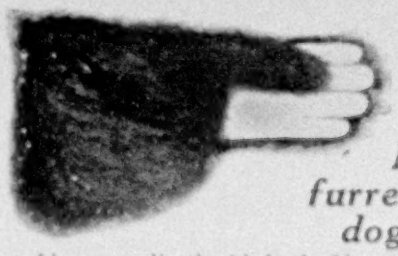

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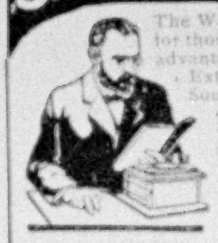

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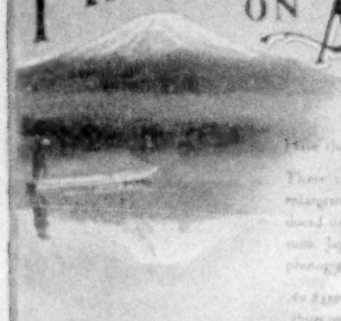

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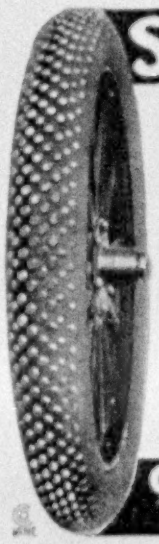

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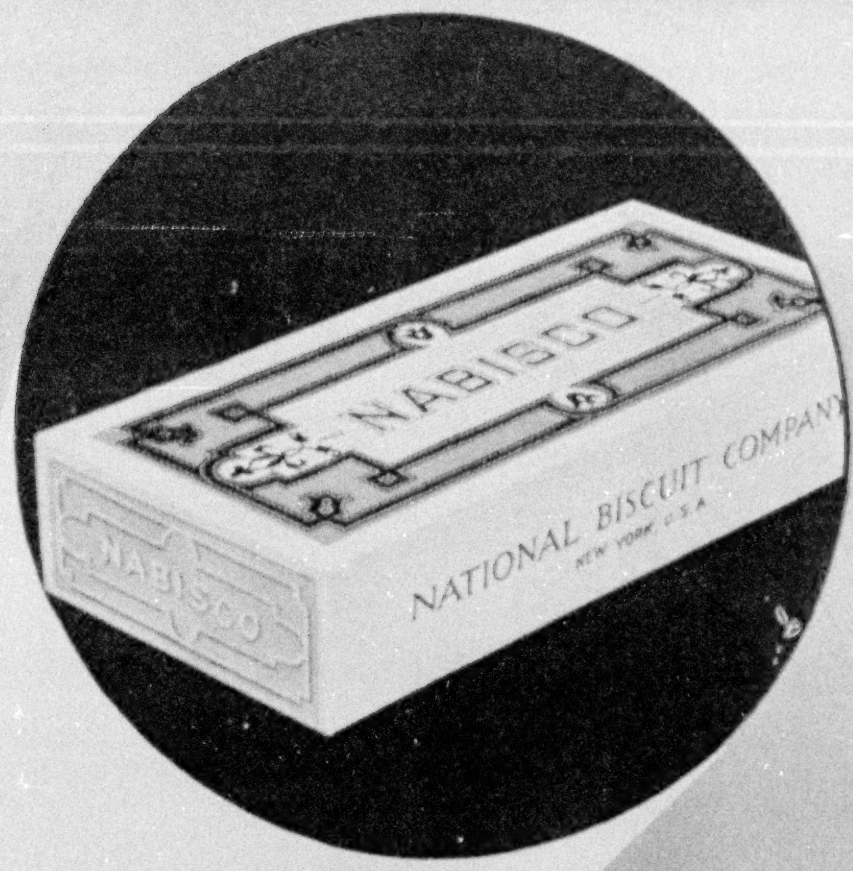

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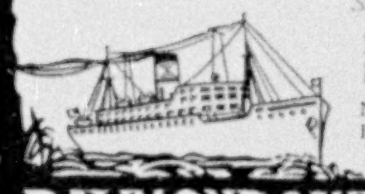

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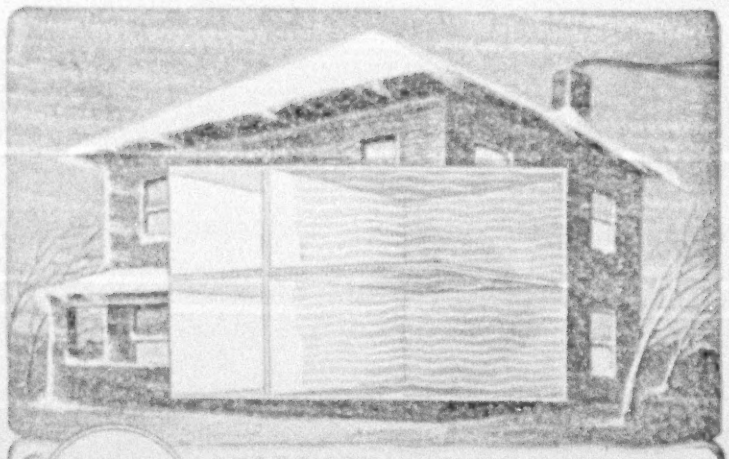

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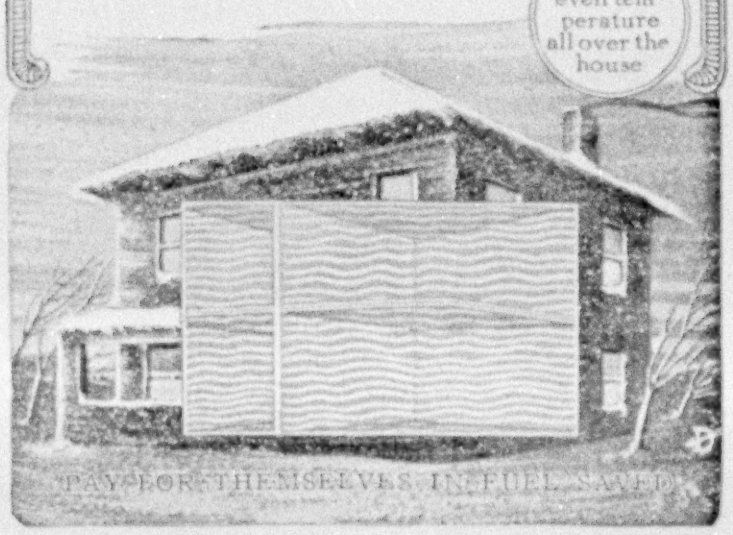

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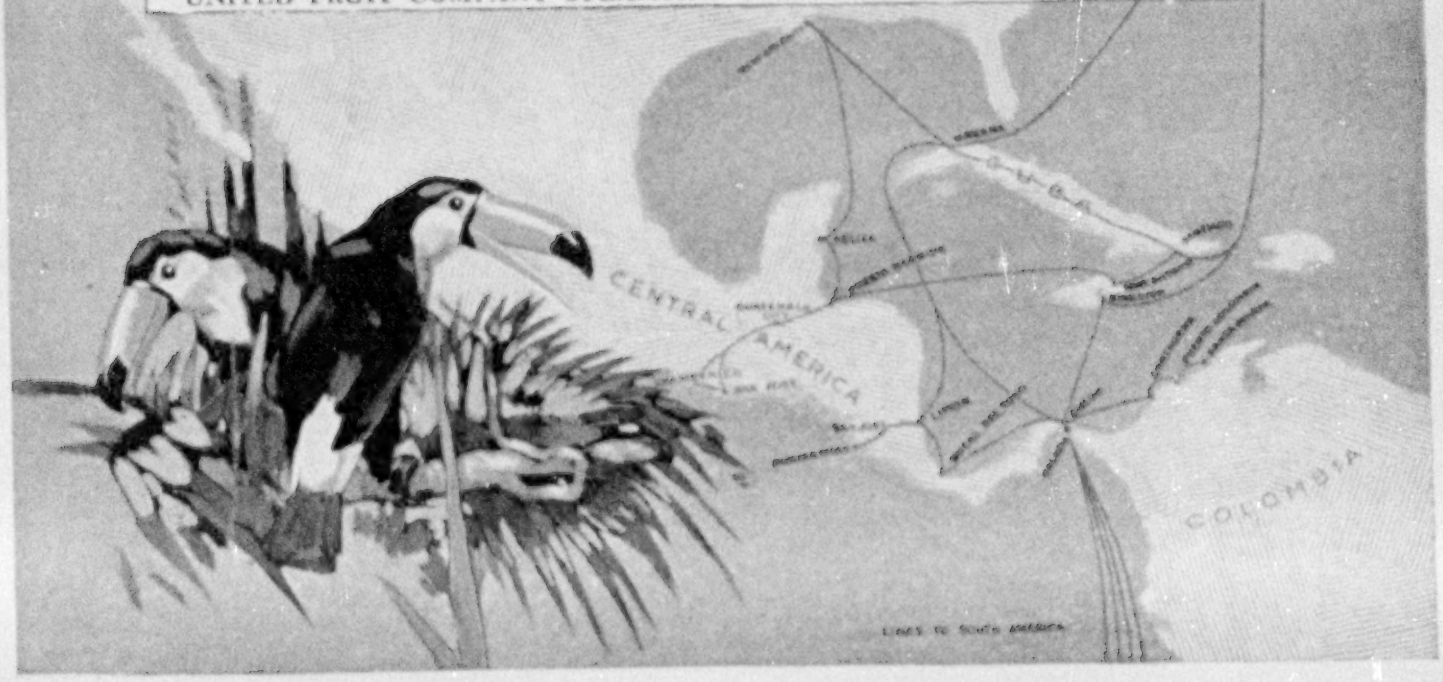

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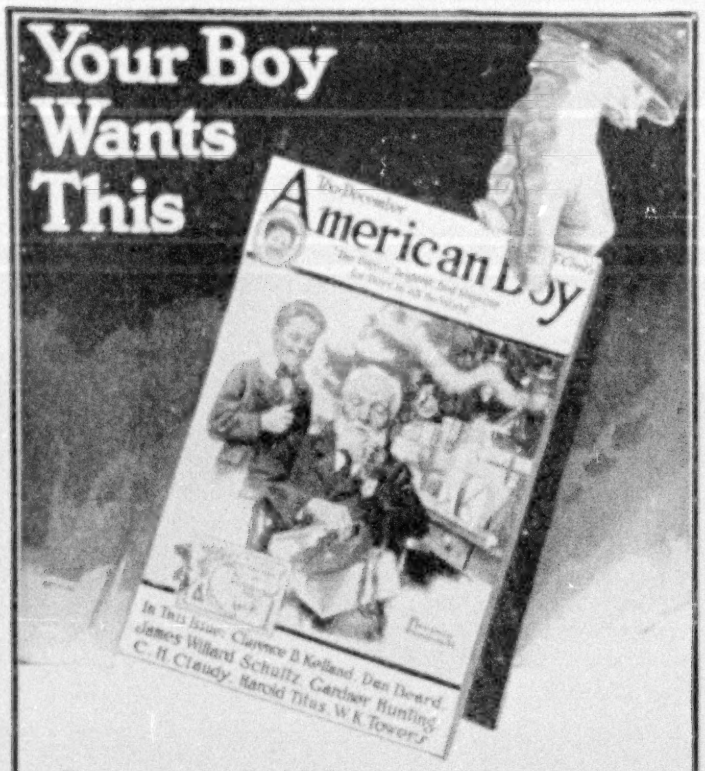

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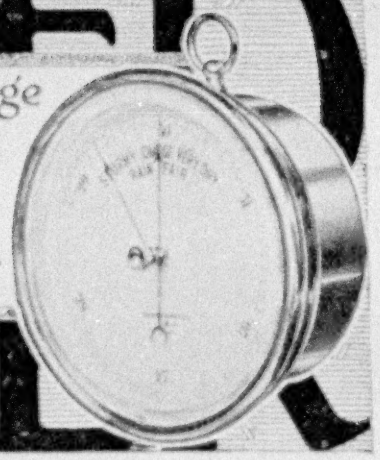

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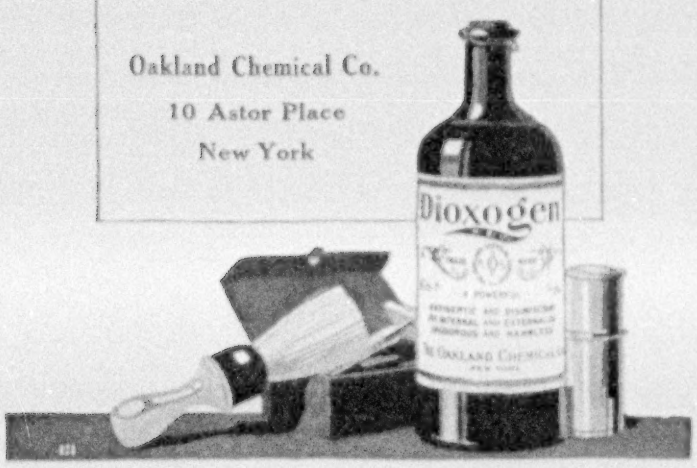

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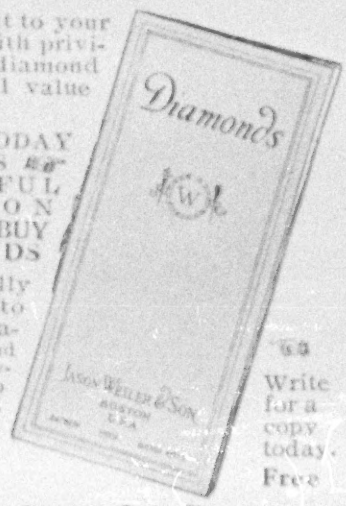

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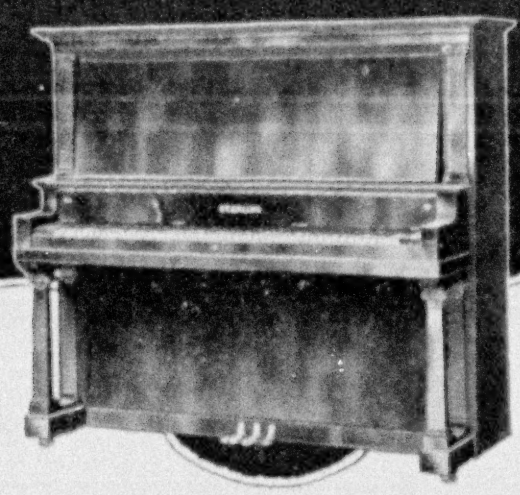

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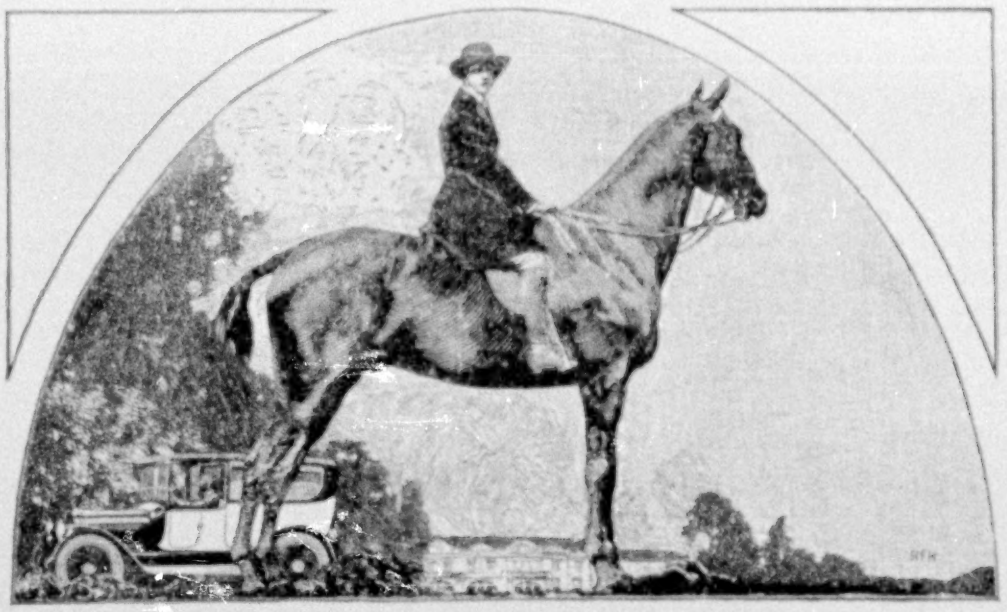

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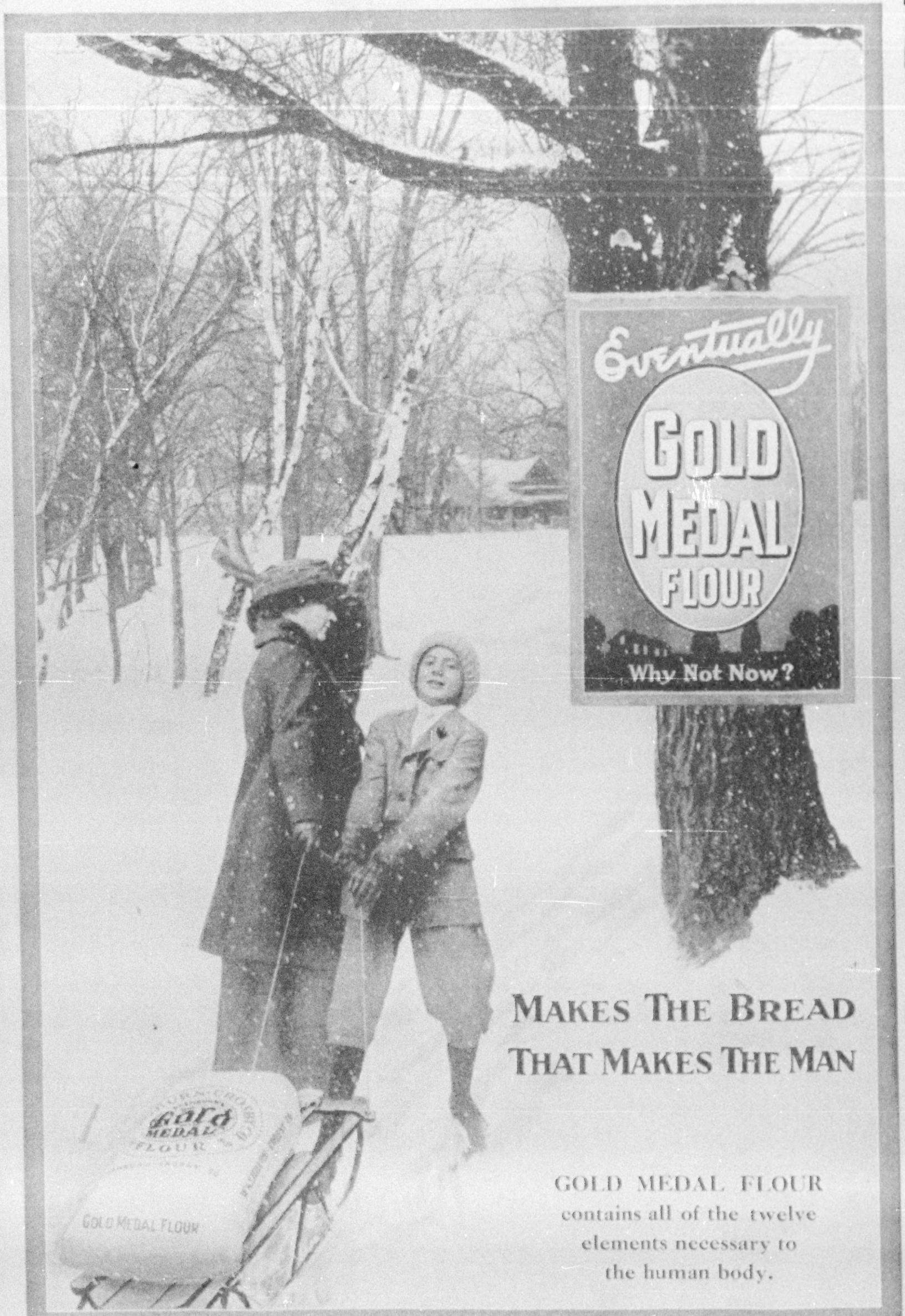

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